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AGRICULTURAL DEVELOPMENT PROGRAMS

OF Iran, Iraq, AND Sudan

EFFECT ON PRODUCTS
COMPETITIVE WITH
U. S. FARM EXPORTS

By Quentin M. West



Foreign Agriculture Report No. 112

FOREIGN AGRICULTURAL SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

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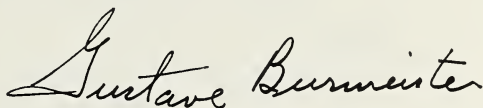
OCTOBER 1958

FOREWORD

This report on agricultural development in Iran, Iraq, and Sudan is the second in a series on the competitive aspects of large-scale agricultural development programs in the Middle East. The first report, "Agricultural Development in Turkey," was issued in January 1958 as Foreign Agriculture Report No. 106. This second report reviews the agricultural situation and international trade of the three countries and the progress they have made in improving agricultural production. Also, it analyzes current programs with respect to the probability of their attaining projected goals and the effect such development will have on the production and trade of products competitive with United States farm exports.

The author visited these countries in the summer of 1957 and consulted with officials of the three governments, as well as private agencies and individuals. He also conferred with officials of the United States Embassies, the International Cooperation Administration in Iran and Iraq and such international agencies as the Food and Agriculture Organization of the United Nations, the Near East Foundation, and the Ford Foundation. The report includes information drawn from publications of the respective governments and reports of United States and international agencies operating in these countries. The final conclusions, however, reflect the judgment of the author.

The field study was conducted through the offices of the United States agricultural attachés in each country. The author sincerely appreciates the assistance he received there and also that given him by the many other persons contacted throughout the study.



GUSTAVE BURMEISTER,
*Assistant Administrator,
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AGRICULTURAL DEVELOPMENT PROGRAMS

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effect on products competitive with U. S. farm exports

By Quentin M. West

Foreign Agricultural Analysis Division

EACH OF THE THREE countries treated in this report has a predominantly agricultural economy which is relatively undeveloped. They also have substantial areas of potentially cultivable land which are unused at present, but in which much of the expansion depends on irrigation developments. With few exceptions, production techniques are backward and production per man is very low. All three countries export one or more agricultural products which are competitive with United States farm exports.

These countries have economic development programs extending for 5, 6, or 7 years. These are planned to increase agricultural and industrial production, utilize more fully the natural and human resources, raise the standard of living of the people, and improve the national economy.

The programs include projects to increase production of crops designed for export and those to be utilized for domestic consumption to reduce imports. In all three countries, emphasis is on greater production of grains and cotton. This increase will largely be absorbed by growing domestic consumption; however, expansion is anticipated in the exports of some products which will compete, at least indirectly, with United States exports. These include cotton from the Sudan, barley from Iraq, and possibly cotton from Iran and Iraq.

Iran

Only 10 percent of Iran's land area is under cultivation and only one-fourth of this is cropped each year. Over 20 percent of the area is potentially cultivable but unused at present. This gives an idea of the possibilities for agricultural development in this country.

Principal crops are wheat, barley, rice, and cotton. Cotton, carpet wool, rice, dried fruits, and nuts are major exports. Cotton competes with United States exports in Western Europe, but most of the rice goes to the USSR and neighboring countries, where the United States does not have a market.

After the settlement of the oil issue in 1954, Iran embarked on a Second Seven-Year Plan, financed by oil revenues, through which \$1,105 million were allocated for the development of agriculture and irrigation, communications, industries and mines, and public utilities. One of the most important projects under the Plan is the coordinated utilization of land, water, and mineral resources in the Khuzistan Plain for the development of agriculture and industry, patterned after the Tennessee Valley Authority in the United States.

Progress has been slow and it is not expected that agricultural production will expand greatly in the next few years. There will be some increase in the production of wheat and barley but it will be absorbed domestically. Increases in rice exports will go to neighboring markets. Cotton production may rise substantially if the quality is improved; however, the projected expansion of the textile industry may even reduce exports for a few years. Iran has the physical potential of becoming important in the world cotton market, but economic and cultural factors will delay the achievement of this potential.

Iraq

Barley, dates, and animal products are Iraq's major exports. Cotton has become of some importance in recent years. Barley is the only product which gives significant competition to United States exports. Principal customers for Iraqi barley are the countries of Western Europe.

Iraq has excellent possibilities for agricultural development. The population is sparse relative to the land now cultivated, and there are millions of acres of land which could be brought under cultivation. Water for irrigation is available in the two great rivers, the Tigris and Euphrates. Oil has provided Iraq the financial means to carry out the most elaborate development plans.

Iraq's current development plan is scheduled to run through 1960, and it is presumed that the new regime will continue this program. About 30 percent of the budget is devoted to irrigation, flood control, and drainage, and it is estimated that the amount of land being cropped annually under irrigation will increase 30 percent by 1960 (over the 1952 level).

Much of the expanded acreage will be in barley, and the quantity available for export will increase. Iraq is having difficulty selling its surplus barley. Wheat production will increase with improved drainage practices; however, most of the increase will be absorbed domestically as consumption levels are raised. Cotton will show the greatest percentage increase. The growing domestic textile industry probably will take all of the production for a few years, but within two or three decades cotton may increase many times over the present level and Iraq may become an important exporter.

Sudan

The Sudan has essentially a one-crop economy—cotton. It earns 60 to 80 percent of the foreign exchange. Over 2 million acres of irrigated land have been developed in the Sudan during the past 30 years, about half of which is in the

Gezira Scheme, where the principal crop is long-staple cotton and production techniques are highly developed.

The Sudan has a well-organized development program, financed principally from receipts from cotton. The most important project under way is the expansion of the Gezira Scheme by another 830,000 acres. Future development includes the construction of the Roseires Dam and the bringing of an additional 2 million acres under irrigation. However, this development depends, to some extent, on settling with Egypt the diversion of the Nile waters.

Long-staple cotton is the crop designed to receive the greatest emphasis; however, the difficulty the Sudan has had the past year in selling its record cotton crop may convince the government that commercial production for export should be diversified. Nevertheless long staple cotton will still retain its comparative advantage over other crops because of the low cost of production in the Sudan relative to other producing countries. This crop will compete, at least indirectly, with United States cotton on the Western European and Far Eastern markets.

The Sudan has great natural resources and its government and people have the will to improve its economic position. It is likely that in the next few decades the Sudan will emerge as one of the most important agricultural nations in the Middle East.

IRAN

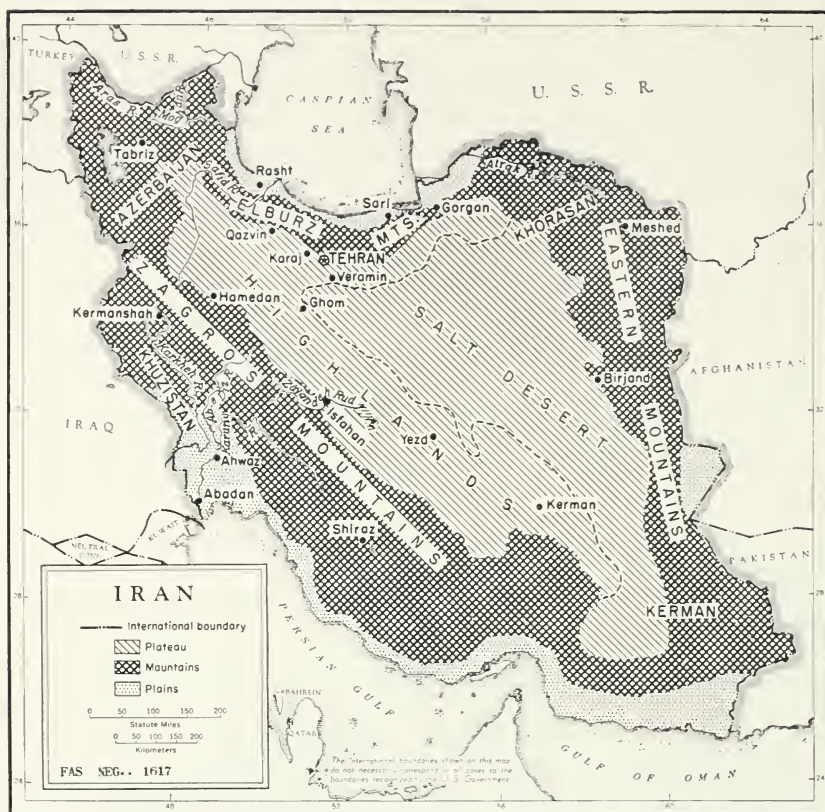
Agricultural Economy

Iran, formerly known as Persia, comprises an area of approximately 628,000 square miles, about one-fifth the size of the United States. Its economy is largely agricultural, although in recent years the production of oil has become increasingly important and now provides the government its principal source of revenue. About 75 percent of the population of 19.5 million—according to the first census completed in 1956—is engaged in crop or livestock production, most of which is on a subsistence level.

Land Characteristics and Use

A great semiarid central plateau, with an elevation of 3,000 to 5,000 feet, forms a dominant part of the country and has two great salt deserts which make up more than one-fourth of the total area. The plateau is bounded on the north by the Elburz Mountains, with peaks of 10,000 to 18,000 feet, which gradually recede into subsidiary ranges in the northeast. To the south and west of the plateau is the Zagros Mountain system which extends to the Turkish border through the agriculturally rich Province of Azerbaijan. Iran has two coasts: The Caspian littoral, with a mild climate and high rainfall, and the Persian Gulf area, which is oppressively hot in summer and has scant rainfall. Another important geographic area is the Khuzistan Plain to the southwest of the Zagros Mountains, through which flows Iran's largest river, the Karun.

Utilization.—Agriculture is concentrated in certain areas of Iran. The north-



ern part of the country—Azerbaijan, the Caspian littoral, the Gorgan Plains to the southeast of the Caspian Sea, and Khorasan in the northeast corner of Iran—comprises about one-fourth of the total area, yet it produces about 60 percent of the wheat and barley, 70 percent of the cotton, 75 percent of the tobacco, 80 percent of the rice and dried fruits, 90 percent of the citrus fruits, and 100 percent of the tea, jute, and silk. Other important agricultural regions are the irrigated areas near Tehran, Isfahan, Shiraz, Yezd, and Kerman, and in the Hilmand Valley, and the dry farm area in the northern part of the Khuzistan Plain.

Of the total land area of 400 million acres, only about 10 percent is under cultivation. In any one year, only 10 to 12 million acres are in crops, about one-fourth of the arable land. The remainder is in fallow. It has been estimated that about 70 percent of the crop area is in grains, 15 percent in fruits and nuts, and the remainder in other field crops.

Approximately 10 percent of the arable land is under irrigation; however, almost 30 percent of the annual crop acreage is irrigated. There has been very limited development of large irrigated areas utilizing Iran's major rivers, and only 20 percent of the irrigated land receives water from streams. At least 70 percent of irrigated area is supplied by qanats (or ghanats), a unique system of underground channels which tap water from underground reservoirs and bring

TABLE 1.—*Land use: Iran, 1956*¹

Use	Area	Percent of total
	<i>1,000 acres</i>	<i>Percent</i>
Arable land, including orchards.....	41,400	10.3
Irrigated land.....	3,950	1.0
Orchards.....	1,680	.4
Permanent pasture.....	24,700	6.1
Forested land.....	46,900	11.7
Unused but potentially cultivable.....	81,500	20.2
Wasteland and other.....	208,100	51.7
Total.....	402,600	100.0

¹ Estimated.

it to the surface by gravity flow. Some of these qanats run underground as many as 25 miles before water is brought to the surface. In recent years there have been a number of pumps in use both from deep wells and from streams.

Agrarian Structure.—Large unoccupied areas of Iran are not claimed even by the state. Of the claimed land, four main types of holdings are found:

(1) Big estates; some 55 percent of the land belongs to about 100,000 wealthy families.

(2) Small holdings; about 20 percent of the land belongs to individual peasants.

(3) State domains; 10 percent belongs to the Shah or to the state.

(4) Religious endowments (waqf); nearly 15 percent of the claimed land has been dedicated in perpetuity for the benefit of religious organizations.

About 60 percent of the farmers work as tenants. Of those cultivators who own their land, 63 percent have less than 2½ acres, 25 percent have 2½ to 7 acres, and only 12 percent have more than 7 acres.

Usually the tenants live under semif feudal conditions, in a village of the landlord who owns not only the land but its stores, schools, and other public institutions. Customary rent arrangement for crop land is to distribute the crop on the basis of the five main contributions toward production: Land, water, work animals, seed, and labor. Generally, the landlord receives at least two-fifths or three-fifths of the crop.

In areas where nomadic grazing is prevalent, flocks may be owned by individual families or jointly by tribes. Grazing areas traditionally belong to the tribal group.

Crop and Livestock Production

Crops.—Wheat is Iran's most important crop in area under cultivation, gross agricultural income, and food consumption. It is grown throughout the country—in the central plateau as a spring grain under irrigation and elsewhere as a winter crop. Before the war, Iran had a wheat surplus, but production has not kept

TABLE 2.—*Principal crops: Area and production in Iran, averages 1935-39, 1945-49, and 1952-54, annual 1955-57*¹

Crop	Average			1955	1956
	1935-39	1945-49	1952-54		
AREA					
	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres
Wheat.....	4, 189	3, 866	4, 113	4, 508	4, 508
Barley.....	1, 922	1, 687	1, 976	1, 949	1, 949
Rice.....	534	543	593	600	618
Cotton.....	452	240	541	650	625
Sugar beets.....	35	64	104	111	116
Tobacco.....	35	37	52	47	52
	Average		1955	1956	1957
	1935-39	1952-54			
PRODUCTION					
	1,000 m. t.	1,000 m. t.	1,000 m. t.	1,000 m. t.	1,000 m. t.
Wheat.....	1, 962	2, 284	2, 740	2, 500	3, 000
Barley.....	777	828	880	800	1, 000
Rice, milled.....	253	338	226	350	340
Pulses.....	100	159	135	135	136
Cotton.....	37	50	60	62	61
Sugar, refined.....	21	74	83	84	88
Tobacco.....	16	14	13	14	22
Tea.....	1	6	7	7	7
Cottonseed.....	75	110	133	138	136
Sesame.....	7	10	10	10	11
Vegetables and melons.....	600	797	800	900	910
Citrus fruits.....	70	99	98	105	105
Grapes.....	280	250	240	255	258
Dates.....	120	135	100	130	105
Raisins.....	32	48	55	62	62
Apricots, dried.....	6	7	6	8	10
Almonds.....	23	17	4	10	14
Pistachio nuts.....	2	6	2	2	7
Walnuts.....	6	6	6	6	6

¹ Because of lack of official statistics for many crops, some of these data are based on estimates.

pace with increased population and consumption; so, in some years, wheat must be imported. Price of wheat has been controlled and cheap bread subsidized. This subsidy was abolished in July 1957, government prices increased, and marketing controls reduced. The wheat purchase program is running into difficulty because there is not sufficient spread between the government's purchase price for wheat and its selling price for flour. Also, there is only limited price differential for location and none for seasonal variation in supply.

Barley is the second grain, and is grown in the same localities as wheat. It is largely used for livestock feed when there is a good wheat crop. Rice is the second most important food crop; about 75 percent of the crop is grown in the Caspian littoral. Some corn, millet, and grain sorghum are also produced. Lentils and beans are the important pulse crops.

Cotton has been cultivated in Iran for several centuries. Production has fluctuated greatly, but during the past few years it has been fairly stable. Principal areas of production are the Gorgan and Mazanderan Plains near the Caspian Sea (accounting for 50 percent of the total), the Khorasan area in northeastern Iran, and the Veramin Plains near Tehran.

Dates are the staple food along the Persian Gulf and in the southeast. Other dried fruits include raisins and apricots.

Sugar beet production meets only part of Iran's sugar needs; beets are raised under irrigation on the plateau. Many years ago, sugarcane was cultivated in the Khuzistan Plain and revival of this crop is being attempted in the area.

Tea is found along the Caspian Sea but production is also greatly below domestic requirements. Opium was once an important crop but its production has been prohibited in the past 2 years.

Tobacco production this year increased 50 percent over that of last year, principally because of good weather but also because of a 10-percent increase in acreage. There is a program to improve the quality of the tobacco.

Total agricultural production has shown substantial increase, as is indicated by the following index. (The favorable weather of 1957 is reflected in the high index for that year.)

1935-39.....	83
1952-54.....	100
1955.....	113
1956.....	115
1957.....	121

Livestock.—Livestock are very important to Iran's economy. Since time immemorial the tribes of the plateau have migrated with their flocks between the lowlands and the mountain slopes and have lived almost entirely on the products of their flocks. Dairy products (principally from sheep and goat milk) supply a substantial part of the food and the agricultural income of many Iranians. Wool provides the basis of the important carpet industry, which gives Iran its second most important export (after oil). Wool production was estimated at 20,000 metric tons (unwashed) in 1957.

Present animal population is estimated at 21.5 million sheep, 11.5 million goats, and 4.5 million cattle.

Technology.—Farming techniques in Iran are even more primitive than in some neighboring countries. The ground is tilled by a wooden or nail plow pulled by oxen or donkeys. The small sickle, the wooden fork, and the spade and pick are typical implements. Grain is threshed by means of a board pulled by animals.

Manure is burned for fuel, and only in few areas is commercial fertilizer used. The use of insecticides is not widespread.



Two big problems of Iranian agriculture are pictured here: Low yields and out-moded farm practices. Above, a farmer and his son harvest their poor crop of wheat. Below, wheat is threshed in the age-old way.



Marketing facilities are not well developed. Most tenants sell very little produce and have almost no cash income. Commercial stocks generally come from the landlord's share.

In some areas, agricultural machinery has been introduced. In spite of the lack of spare parts and the poor repair facilities which cause some of these experiments in mechanization much difficulty, there are over 5,000 tractors in operation today and there is a strong demand for agricultural machinery.

Situation in the World Agricultural Market

Pattern and Competitive Aspects

Iran's foreign trade is characterized by the exportation of raw materials and the importation of manufactured goods. The only important finished (by hand) product is the famous Persian rug, the export value of which is about \$15 million annually. Petroleum is by far the most important export, amounting to about \$235 million.

Of the agricultural products, cotton has been the biggest foreign exchange earner. But increased domestic requirements and lower prices for Iranian cotton in the international market have cut exports the past 2 years. France normally takes about a third of the cotton but indicates a reluctance to renew the trade agreement on the same basis. Barter agreements with West Germany and the USSR may improve the export situation.

TABLE 3.—*Principal agricultural commodities: Exports from Iran, 1954-56*¹

Commodity	1954		1955		1956	
	Quantity	Value	Quantity	Value	Quantity	Value
	<i>Metric tons</i>	<i>1,000 dol.</i>	<i>Metric tons</i>	<i>1,000 dol.</i>	<i>Metric tons</i>	<i>1,000 dol.</i>
Cotton, lint	46, 237	35, 202	36, 303	21, 658	38, 513	22, 302
Wool, greasy	7, 953	6, 857	9, 025	9, 185	9, 471	8, 864
Raisins	29, 451	4, 787	38, 018	6, 684	37, 370	6, 909
Animal hair	2, 170	2, 985	2, 789	4, 740	2, 843	4, 887
Almonds	7, 600	4, 806	4, 599	3, 266	4, 427	4, 559
Hides and skins	6, 538	5, 147	6, 527	5, 317	7, 579	3, 862
Gum tragacanth	2, 900	2, 217	2, 583	2, 825	2, 945	3, 553
Sausage casings	507	2, 279	559	2, 558	620	3, 004
Pistachios	3, 546	3, 274	1, 606	1, 356	1, 922	2, 029
Apricots and peaches (dried)	7, 494	1, 893	3, 826	934	6, 882	1, 904
Oilseeds	22, 225	2, 671	34, 580	3, 674	13, 139	1, 835
Dates	32, 424	1, 348	30, 845	1, 323	28, 784	1, 242
Rice	61, 207	8, 091	28, 438	3, 502	3, 055	375
Total exports ²		120, 249		103, 432		105, 477

¹ Year beginning Mar. 21.

² Excluding petroleum exports.

TABLE 4.—Principal agricultural commodities: Imports into Iran, 1954-56 ¹

Commodity	1954		1955		1956	
	Quantity	Value	Quantity	Value	Quantity	Value
	<i>Metric tons</i>	<i>1,000 dol.</i>	<i>Metric tons</i>	<i>1,000 dol.</i>	<i>Metric tons</i>	<i>1,000 dol.</i>
Sugar.....	212, 562	35, 495	221, 648	29, 316	269, 066	29, 654
Tea.....	4, 634	9, 473	10, 098	21, 794	7, 315	12, 331
Fats and oils.....	(²)	(²)	(²)	(²)	12, 232	3, 565
Total imports.....		248, 828		337, 896		³ 262, 462

¹ Year beginning Mar. 21.² If any, not available.³ Excluding imports of wheat, dairy products, and fats and oils from the United States under Public Law 480 agreement.

TABLE 5.—Direction of trade: Exports by country of destination and imports by country of origin, Iran, 1955 and 1956

Country	Exports				Imports			
	1955		1956		1955		1956	
	<i>1,000 dol.</i>	<i>Percent</i>	<i>1,000 dol.</i>	<i>Percent</i>	<i>1,000 dol.</i>	<i>Percent</i>	<i>1,000 dol.</i>	<i>Percent</i>
Germany ¹	18, 504	17. 9	15, 282	14. 8	48, 930	14. 5	48, 395	18. 4
United States.....	13, 096	12. 7	11, 831	11. 4	53, 086	15. 7	² 49, 146	18. 7
United Kingdom.....	8, 269	8. 0	7, 506	7. 3	27, 502	8. 1	30, 495	11. 6
U.S.S.R.....	13, 879	13. 4	17, 864	17. 2	24, 884	7. 4	17, 717	6. 8
Japan.....	2, 213	2. 1	1, 987	1. 9	22, 350	6. 6	20, 051	7. 6
France.....	10, 924	10. 6	13, 880	13. 4	8, 181	2. 4	8, 059	3. 1
India.....	2, 549	2. 5	3, 658	3. 5	20, 707	6. 1	12, 569	4. 8
Italy.....	7, 254	7. 0	6, 163	5. 9	8, 224	2. 4	6, 089	2. 3
Total ³	103, 432	100	103, 653	100	337, 896	100	262, 462	100

¹ Federal Republic and Eastern Zone.² Does not include Public Law 480 shipments.³ Excluding oil petroleum exports.

Dried fruits and nuts have been consistent exports for many years. These are shipped to Western Europe, the USSR, and India.

Rice is the other major crop grown for export. At the end of 1956, an embargo was placed on its export in order to control the price and improve the food situation. This has since been lifted. Exports in the current year will depend on the outcome of present governmental negotiations, chiefly with the USSR, under which attempts are being made to exchange rice for sugar.

Iran is attempting to establish an export program for tobacco and negotiations are being made with the Soviet Union, the United Kingdom, West Germany, and France.

TABLE 6.—Exports: *Principal commodities from Iran competitive with U. S. farm exports, by countries of destination, 1954 and 1955*

Commodity and country	1954	1955
Cotton:	<i>Metric tons</i>	<i>Metric tons</i>
France	14, 265	12, 440
Italy	5, 597	6, 122
Germany ¹	7, 942	4, 911
Japan	7, 146	2, 376
Other	11, 287	10, 454
Total	46, 237	36, 303
Rice:		
USSR	31, 038	9, 335
Oman	11, 484	11, 050
Japan	14, 032	(²)
Other	4, 653	8, 053
Total	61, 207	28, 438

¹ Federal Republic and Eastern Zone. ² If any, included with other.

Livestock products have been major sources of income for Iran for many years. Coarse wool for use in making carpets has the greatest value and is shipped principally to the USSR and the United States. The United States is the biggest buyer of hides and skins; other customers are Italy, West Germany, and the USSR. The United States takes more than half of Iran's exports of sausage casings.

Of the agricultural imports, sugar and tea are the most important. In times of poor crops, as in 1956, substantial quantities of wheat are also imported. Some vegetable oils and dairy products were imported last year.

Germany (Federal Republic and Eastern Zone) and the USSR are Iran's best customers for exports other than oil. Other major customers are the United States, France, the United Kingdom, and Italy. The United States and Germany are the biggest suppliers, followed by the United Kingdom, Japan, the USSR, and India. In 1956, Iran had an unfavorable balance of trade with all these countries except the USSR (excluding oil).

Competitive Exports.—Cotton and rice are the major Iranian products which compete with United States farm exports in the world market. Most of the cotton goes to Western Europe, with France taking one-third of the total. Substantial amounts go to Japan, also one of the United States big cotton customers. Most of the cotton is of lower quality than in many other producing countries.

Normally, more than half of Iran's rice goes to the USSR, and thus is out of the United States trade area. The United States also does not sell rice to countries of the Arabian Peninsula, where Iran has important customers. In some years, rice from Iran goes to Japan, where it does compete with United States exports.

If Iran succeeds in establishing an export trade in tobacco, it will compete with United States products in Western Europe.

Trade Policies.—Iran's general policy is toward trade liberalization and bilateral trade agreements. The importation of a few agricultural items, such as citrus and deciduous fruits, is prohibited to protect domestic production. Imports of wheat, barley, and flour were prohibited as of March 1958. Import quotas are established for some dairy products, vegetable oils, and live animals. Duties on basic agricultural imports are generally low, but tariff on sugar and vegetable fats was increased this year. Butter and butter oil have been liberalized.

Export of these agricultural products is prohibited: Wheat, wheat flour, barley, certain grades of rice, sugar, cottonseed, raw jute, and cow and buffalo hides. Tobacco and opium are controlled by the government monopoly. The only opium exported is from limited quantities available from production before the ban. Rice exports must have special authorization.

The only export subsidy has been in the form of preferential railroad freight rates for all commodities for export, although recently tea exporters were allowed a reduction in export duties if they held export certificates.

Iran has signed bilateral trade agreements with the USSR, Poland, Czechoslovakia, Pakistan, Italy, France, and Austria.

Trade With the United States

Agricultural trade between the United States and Iran has always been highly in favor of Iran; but in total trade the balance has been in favor of the United

TABLE 7.—United States-Iran trade: Value of exports, imports, and trade balance, averages 1935-54, annual 1956 and 1957

Item	Average				1956	1957
	1935-39	1940-44	1945-49	1950-54		
U. S. exports to Iran:	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Agricultural.....	(¹)	200	1,000	877	9,573	6,213
Nonagricultural.....	5,687	20,143	40,405	29,480	66,787	76,614
Total.....	5,687	20,343	41,405	30,357	76,360	82,827
Percent agricultural.....		1	2	3	13	8
U. S. imports from Iran:						
Agricultural.....	500	1,900	4,400	13,800	18,849	19,399
Nonagricultural.....	3,690	6,415	18,661	11,470	18,393	16,093
Total.....	4,190	8,315	23,061	25,270	37,242	35,492
Percent agricultural.....	12	23	19	55	51	55
Trade balance in favor of U. S.	1,497	12,028	18,344	5,087	39,118	47,335

¹ None or negligible. U. S. trade statistics.

TABLE 8.—*U. S. agricultural exports to Iran: Quantity and value, 1956 and 1957*

Commodity	Quantity			Value	
	Unit	1956	1957	1956	1957
		<i>Thou-</i> <i>sands</i>	<i>Thou-</i> <i>sands</i>	<i>1,000 dol.</i>	<i>1,000 dol.</i>
Nonfat dry milk.....	Pound.....	3, 081	2, 128	365	261
Other dairy products.....				2, 430	201
Hides and skins, raw.....	Number.....	8	11	66	113
Tallow, inedible.....	Pound.....	1, 887	3, 514	181	354
Wheat, grain.....	Bushel.....	2, 790	2, 720	5, 546	4, 551
Other grains and preparations.....				106	87
Vegetables and preparations.....				36	80
Fruits and preparations.....				62	96
Vegetable oils and fats.....	Pound.....	149	699	39	158
Food for relief or charity.....				545	115
Other agricultural commodities.....				197	197
Total agricultural.....				9, 573	6, 213
Nonagricultural.....				66, 787	76, 614
Total exports.....				76, 360	82, 827

U. S. trade statistics.

TABLE 9.—*U. S. agricultural imports from Iran: Quantity and value, 1956 and 1957.*

Commodity	Quantity		Value	
	1956	1957	1956	1957
	<i>1,000</i> <i>pounds</i>	<i>1,000</i> <i>pounds</i>	<i>1,000 dol.</i>	<i>1,000 dol.</i>
Sausage casings.....	200	97	1, 059	372
Sheep and lamb skins.....	8, 489	7, 639	3, 499	3, 017
Goat and kid skins.....	1, 126	702	535	299
Cummin seed.....	2, 962	2, 123	315	284
Drugs, herbs, roots, etc.....		142	159	109
Oilseeds.....	169	78	17	9
Dates.....	4, 404	3, 291	229	200
Walnuts, shelled.....	1, 394	615	679	314
Pistachio nuts.....	2, 161	3, 911	1, 130	2, 161
Wool, unmanufactured, free.....	4, 680	4, 598	2, 686	2, 379
Wool, unmanufactured, dutiable.....	2, 683	3, 646	8, 178	9, 690
Hair, animal, unmanufactured.....	812	1, 224	319	504
Other agricultural commodities.....			44	61
Total agricultural.....			18, 849	19, 399
Nonagricultural.....			18, 393	16, 093
Total imports.....			37, 242	35, 492

U. S. trade statistics.

States. Agricultural products make up a small percent of United States exports to Iran, but account for more than half of the imports.

Most important United States exports to Iran are wheat and dairy products, and the major commodities the United States imports from Iran are livestock products—wool, hides and skins, animal hair, and sausage casings. It also takes large quantities of pistachio nuts and walnuts.

Iran has received 162,000 metric tons of wheat and 736 tons of butter oil under Public Law 480 programs.

Agricultural Development

History and Recent Progress

The first real effort to improve the Iranian economy was made in the 1920's and 1930's, when Reza Shah, father of the present Shah, embarked on a program of economic and social modernization. The results of the program appeared largely in the form of small industrial plants and the provision of electric light and power plants for most of the sizable towns. Foreign specialists were employed to guide the financial, administrative, and industrial activities of the government and especially in the construction of the railroad system. In 1938 the line from the Persian Gulf to the Caspian Sea was completed, and work was begun on two lateral lines—one to the east toward Meshed and one to the west toward Tabriz. (The one to Meshed was completed in 1956 but the Tabriz branch is not yet completed.) A road construction program was also pushed during these years to add to the country's expanding transportation system.

The forced settling of the nomadic tribes and the distribution of the land of the Gorgan Plain and adjacent areas along the Caspian Sea converted this fertile area from pasture to one of the most productive cultivated regions in the country. This was the most significant agricultural advancement during this period.

Reza Shah did much for Iran, but many basic reforms and potentially useful projects were overlooked while some of those undertaken were premature and superficial. The world depression and foreign exchange shortages caused a slow-up of much planned development, and the Shah's forced abdication at the beginning of World War II brought his program to a stop.

Seven-Year Plan.—Iran embarked on a Seven-Year Plan for economic development in 1949. The entire revenues of the government derived from the payment of the Anglo-Iranian Oil Company were to be assigned for the execution of the Plan, and a Plan Organization was established to direct the development program.

Several foreign companies, combined under the name of Overseas Consultants, Inc., were engaged to make an analysis and prepare a report on the Seven-Year Plan. This organization was subsequently retained as a foreign engineering consultant service to make necessary studies for new projects under the Plan.

The Plan called for the expenditure of 21 billion rials¹ (\$276 million) over

¹ Rate of exchange, 76 rials=\$1.00 U. S.



Planting tobacco on Iran's Gorgan Plain. Iran is expanding its tobacco production and hopes to export to Western European markets, traditional outlets for United States tobacco. The Gorgan Plain has become one of the most productive areas in Iran. Here, during the past decade, nomadic tribes have been settled onto farms and the land transferred from pasture to crops.

the 7-year period for agriculture (23.8 percent), communications (23.8 percent), social welfare (28.7 percent), industry and mines (19.7 percent), and post and tele communications (4.0 percent). Recommendations for agricultural development were principally for irrigation and drainage and for introduction of farm machinery, construction of grain silos and sugar beet factories, purchasing fruit processing and drying equipment, and expanding cotton, jute, wool, and silk textile mills.

Substantial oil revenues were received by the Plan Organization between 1949 and 1951 and a few projects were carried out. However, owing to the instability of the political situation in the country, the activities of the Plan Organization were limited. Following the nationalization of the oil industry in 1951, oil revenues were cut off and the Seven-Year Plan was practically terminated. Some of the projects of the Plan were continued through the International Cooperation Administration (ICA).

Current Development Programs

Settlement of the oil issue in October 1954 was an essential prerequisite to economic progress in Iran. With oil revenues again accruing to the government it was possible to reactivate development programs.

Second Seven-Year Plan.—After 9 months of debate² a second and larger Seven-Year Plan was approved by the Parliament in March 1956.

Expenditures for the 7-year period ending September 24, 1962, were authorized in the amount of 70 billion rials (\$921 million).

Funds were allocated to these categories:

	Programs under way <i>Mil. rials</i>	Programs proposed <i>Mil. rials</i>	Programs to be planned <i>Mil. rials</i>	Total <i>Mil. rials</i>
Agriculture and irrigation.....	6, 260	9, 458	2, 500	18, 218
Communications.....	5, 367	17, 454	.....	22, 821
Industries and mines.....	2, 759	6, 801	1, 000	10, 560
Public utilities.....	2, 814	15, 587	.....	18, 401
Total.....	17, 200	49, 300	3, 500	70, 000

The Plan Organization revised the Plan early in 1956 and raised proposed total expenditure by 20 percent, to 84 billion rials (\$1,105 million).³ Revised allocations were:

	<i>Mil. rials</i>
Agriculture and irrigation.....	21, 850
Communications.....	27, 390
Industries and mines.....	12, 672
Social development.....	22, 080
Total.....	84, 000

Financing the Plan.—Iran's oil revenues were divided as follows: About 62 percent to the Plan Organization, 28 percent to the National Iranian Oil Company (NIOC), and 10 percent to the Ministry of Finance to support the general budget. After March 1958, 80 percent was to go to the Plan Organization and 20 percent to NIOC; however, due to budgetary difficulties, the Seven-Year-Plan Law was amended to reduce the Plan Organization's share of oil revenues to 60 percent. Total oil revenues for 1956 amounted to about \$160 million and increased to \$208 million in 1957.

According to estimates, oil revenues for the Plan were to cover total expenditures over the 7-year period; however, because expenditures increased faster than revenues in the first years, a deficit was expected between 1956 and 1959, with a maximum deficit of \$140 million in 1958. The law initiating the Plan authorized a maximum loan of \$240 million to meet this deficit.

The Plan Organization applied to the International Bank for Reconstruction and Development (IBRD) for a \$75-million credit and was granted this loan in January 1957. Credit of \$53 million has also been extended to Iran by the United States Export-Import Bank, subject to approval of individual projects. Two projects have been submitted and approved—the purchase of diesel engines for

² Principal points at issue were the extent of authority granted the Plan Organization in controlling expenditure for the oil revenues and the relative degree of authority of the Organization and the various ministries in administering the projects.

³ This was not finally approved until December 1957.

the railroad and the construction of the Karaj Dam. With the change in the allocation of oil revenues it is expected that the Plan Organization income will have to be supplemented by additional Export-Import Bank and Development Loan Fund credit.

When officials of the IBRD reviewed the Seven-Year Plan, they criticized the program because expenditures rose to a peak and then tapered off. They recommended that the Plan be rephased so that expenditures would rise gradually to a plateau in accordance with prospective oil revenues. This rephasing reduces the amount of deficit financing necessary.

Development of the Khuzistan Plain.—The Plan Organization has given special emphasis to the development of the Khuzistan Plain. Projects in the various categories for the whole area are being planned and coordinated by a private corporation under contract to the Plan Organization. The Khuzistan drainage basin, comprising much of the southwestern part of Iran, covers about 58,000 square miles. The plain proper—about 12,000 square miles—has a warm semiarid climate. There is sufficient rainfall in the higher areas to support dry-farm grain production during good years, but precipitation varies so much from year to year that low yields, or crop failure, are frequent. All other crop production depends on irrigation.

The area has five principal rivers. The Karun and its principal tributary, the Ab-e-Diz, are the most important. The Karkheh is next in size but its flow in late summer is very low. These rivers empty into the Shatt-al-Arab on the Iraqi border. The Jarrahi and Hindijan, in the southeastern part of the plain, empty into the Persian Gulf.

As part of the Mesopotamian Plain, this area has been cultivated at varying degrees of intensity from very early times. Principal crops throughout the centuries have been wheat and barley, but at certain times, alfalfa, fruits and vegetables, sugarcane (Khuzistan means "land of sugarcane"), cotton, and even a silk industry have flourished, too.

The irrigation works, and the roads and bridges connecting Khuzistan with the rest of Iran, were destroyed during the Arab invasion in the seventh century, and this area has never returned to the former level of productivity. The discovery of oil there has revived interest in the development of the Khuzistan.

At the present time there are approximately 500,000 acres under irrigation in the upper basin and 185,000 acres on the plain. Water is supplied to most of this land through the use of small temporary diversion dams or private and community pumps on both sides of the Karun and Karkheh Rivers. One permanent diversion dam at Aha Dasht has been in operation about 20 years and supplies water for 5,000 acres. The largest pump scheme is at Hamidiyeh, a community project under the supervision of the Ministry of Agriculture, which irrigates 2,500 acres.

It has been estimated (optimistically) that there are about 2 million acres of land in the upper basin with topography and soils suitable for cultivation under irrigation, and about 1.8 million acres on the plain. However, much of the soil in the lower plain is saline and is so low that it cannot be drained by gravity.

In March 1956 the Plan Organization contracted with the Development and Resources Corporation of New York ⁴ (the Iranian branch is called Khuzistan Development Service [K. D. S.]) to make technical surveys and investigations of the resources of the Khuzistan region and to prepare, within 2 years, a comprehensive scheme for the long-range development of these resources. Also, proposals were to be made for immediate action in selected undertakings, even before the specific content of the long-range plan was defined.

In December of the same year, another contract was signed, in which K. D. S. was made the agent of the Plan Organization in the Khuzistan and given direct managerial responsibility for helping to execute the development program. This included not only new projects proposed by K. D. S. but also related projects previously initiated in the region by the Plan Organization and other agencies of the government.

The first of these was the Karkheh Project located near Ahwaz. A modern diversion dam was completed by the government in 1956 and main canals started on both sides of the river. The left bank canal was designed to carry 45 cubic meters of water per second and the right bank canal 15 cubic meters. Total area to be irrigated was to be about 150,000 acres.

This project was not well planned;⁵ as yet, no land has been irrigated. The dam is at too low an elevation on the plain and most of the land is saline and poorly drained and cannot be drained except by pumping. In some summers only about 5 cubic meters per second of water are available for irrigation; there is no question but what this limited water would be more useful if diverted higher on the plain where the soil is better. Also, the canals have been damaged by flash floods.

The K. D. S. has undertaken a more-or-less salvage job on this project. Development of 12,000 acres on the right bank is planned; FAO has been given the contract for laying out farm units and planning cropping systems. About 1,200 acres have been planted and will be irrigated by pump until the canal is completed.

The second project undertaken by K. D. S. is the Gotvand Project on the Karun River, about 100 miles north of Ahwaz. Construction is expected to begin in 1958 for the dam and canal system, which is designed to irrigate 200,000 acres. This project may be delayed or even replaced by the new Diz Project.

A third project being planned by K. D. S. is a sugarcane development to be located near Shush between the Karkheh and Diz Rivers. Approximately 25,000 acres will be put in cane in the near future. A sugar mill and refinery will be constructed by 1961, which will produce 28,000 tons of refined sugar. It is hoped that this enterprise can be expanded to provide much of Iran's sugar needs.

The latest project approved by the Plan Organization to be developed by K. D. S. is the Diz Project on the Ab-e-Diz River. That is a multipurpose dam,

⁴ Headed by David E. Lilienthal and Gordon R. Clapp, formerly chiefs of the Tennessee Valley Authority.

⁵ Much of the work was carried out by the oil companies, reportedly to provide employment for their workers during the years when oil production was interrupted.

460 feet high, that will generate 80,000 kilowatts of power, control floods, and store enough water to irrigate 250,000 acres of land. Cost will be from \$120 million to \$150 million and will be financed through the Plan Organization by a loan from IBRD. Questions have been raised about the possibility of irrigating as much land more cheaply through diversion dams lower on the Diz, and developing electric power by the use of natural gas now being wasted in Khuzistan.

Another project of significance in the Khuzistan is the development of cotton under the Cotton Company, a subsidiary of the Plan Organization. Cotton was not produced in this area for 12 years—1944–1955—because of the spiny bollworm, but 1,200 acres of cotton were raised in 1956. If the program of pest control is successful, cotton will become an important crop for the area.

An area development program, similar to the Khuzistan, is being considered for the Baluchistan area in southern Iran.

Agriculture and Irrigation.—The development program for agriculture and irrigation is prepared and planned by the respective Ministries in cooperation with the Plan Organization. The Ministries also carry out the operations under the supervision of the Plan Organization. Projects proposed under the Seven-Year Plan are as follows:

	<i>Million rials</i>
Agriculture	7,229
Agricultural and irrigation training.....	316
Cultivation and improvement of crops.....	695
Animal husbandry.....	1, 152
Plant pest.....	1, 119
Forests.....	1, 168
Development of villages and barren lands.....	647
Agricultural extension.....	406
Agricultural machinery.....	703
Meteorology.....	109
Rural economy and agricultural economy.....	181
Silos.....	435
Agricultural industry.....	298
Irrigation	10,376
Irrigation and dam surveys.....	756
Irrigation and dam construction.....	8, 552
Qanats and deep wells.....	1, 068
Khuzistan survey	200
Fertilizer plant	1,830
Total	¹ 19, 635

¹ Does not include latest revisions.

Nothing of a spectacular nature has been accomplished in agricultural improvement under either of the Seven-Year Plans, although production has gradually increased. Fairly effective cooperation has been established between the Ministry of Agriculture, the Agricultural College at Karaj, the U. S. International Cooperation Administration (ICA), the Food and Agriculture Organization of the United Nations (FAO), the Ford Foundation, and the Near East Foundation, and the



Iranian farmers await their share of improved seed wheat, which is being weighed out and distributed. Through its extension service, which is being expanded under the development program, Iran is introducing new farming methods.

outlook for real progress in agricultural training, research, and extension is bright. FAO is concentrating on soil surveys and land and water use. The Ford Foundation is in the field of agricultural economics. The Near East Foundation is co-operating in the Community Development Program.

The function of the Plan Organization in the field of agricultural improvement is to give financial support to the programs of the above agencies. Following are examples of the programs:

Under crop improvement, special attention is being given to improving seed, expanding production of cotton and tea, introducing sugarcane, and aiding farmers who formerly raised opium—which is now prohibited—to shift to new crops. Support of most of these projects is through the Ministry of Agriculture; however, there is a special cotton company charged with improvement of cotton. Under plant protection, the Organization will buy equipment and pay operating costs the first year for control of locust, sen pest on wheat, and mice (a serious pest in Iran). Control of anthrax is an important project under animal diseases, and the Organization is supplying equipment to the 92 veterinary stations throughout the country.

The Organization has established a special corporation to furnish credit—up to 80 percent—for the purchase of farm machinery.⁶ The introduction of agricultural machinery into Iran has not been without problems. In some areas equip-

⁶ ICA also recently loaned the Agricultural Bank \$13 million to finance the importation of tractors.

ment purchase has moved faster than training in operation and maintenance. Also, supply of spare parts is difficult. Some farmers have had to fly parts in from the United States and bring mechanics from Tehran.

The Plan Organization also gives financial support to the agricultural extension program through the Ministry of Agriculture. There are 300 extensionists (to cover 45,000 villages) who cooperate with the Bloc Leader of the Community Development Program, which is modeled generally after the program in India.

Development of irrigation is one of the most important parts of the Seven-Year Plan. Three projects are under way, in addition to those in the Khuzistan Plain which are under K. D. S.

Work is progressing on the Moghan irrigation scheme in northwestern Iran. The first canal, constructed a few years ago, provides water for 7,500 acres which are being cultivated by the Moghan Company, a subsidiary of the Plan Organization. The large diversion canal now under construction will irrigate about 75,000 acres. There are possibilities of more than doubling this area; however, further developments depend on a water use agreement with the USSR. Most of the land now under cultivation is in three crops; wheat, cotton, and sesame, but some alfalfa, orchards, and other crops are being grown.

Construction is about to begin on a dam on the Safid River, along the Caspian coast. About 148,000 acres are now under irrigation in the area and the new dam will supply supplemental water for this land. The project does not include funds for the reclamation of additional land. That would involve a new project and a larger allocation of funds. Rice and tea will be the most important crops in this region.

Diversion of water from the Karun River to the Zayandah River in the Isfahan area was completed in 1955. About 12,000 acres of additional land were irrigated that year and another 42,000 acres in 1956. Also, land formerly irrigated has received a better water supply. There is a dispute over the division of water between the old and the new land.

Another dam which has received considerable attention in Iran and abroad is on the Karaj River. However, this is principally to supply water for the city of Tehran; any irrigation from this source will be incidental. This project is not under the Plan Organization.

Other irrigation projects which are included in the Plan for study and possible development are:

- Dareh Roud Dam.

- Shahrud and Teleghan River relocation.

- Mehran irrigation scheme.

- Saveh irrigation network.

- Doroudzan irrigation network.

- Dasht Mishan irrigation scheme.

- Shadegan irrigation scheme.

- Kazeroun irrigation scheme.

- Dashte Zehab irrigation scheme.

- Depression of Chah Nimeh irrigation scheme.

The use of irrigation wells (other than qanats) has increased substantially in the last few years in some areas. It is reported that several hundred pumps have been sold in the Shiraz area and in Yezd and Birjoud.

Many of the irrigation projects in Iran have run into difficulty, principally because of lack of adequate planning, especially on two points—farm management and resettlement. Too often the study of the project involves only the engineering and construction phases and neglects the questions of soil productivity, salinity, drainage, ground water, land and water rights, farm size, cropping programs, land distribution, social and economic changes, and a host of others.

Industries Processing Agricultural Products.—The textile industry is Iran's second most important industry (after oil). The mills were built during the 1930's under Reza Shah. The government owns some of them—three cotton spinning and weaving mills, one cotton knitting mill, one jute mill, and two silk factories; they are operated for the Plan Organization by the Iran Textile Company. The remaining cotton mills, all the woolen mills, and the hand loom industry are privately owned. Total number of spindles now installed is 414,000; an additional 28,000 are expected to be available by the end of 1959. Production is inefficient and the industry has difficulty in competing with foreign imports. Only 30–40 percent of Iran's needs are supplied domestically; the rest of the cotton cloth is imported from Japan, the USSR, and India.

The Seven-Year Plan includes \$7 million for improving the industry. Two new cotton spinning and weaving mills have been obtained in Italy and will be installed at Qazvin and Karaj. Proposals have been made to purchase three more mills and improve eight of the mills—government and private—now in operation. Iran hopes to be able to double present textile production.

Also, the Plan Organization has allocated \$27 million for constructing three new 1,000-ton sugar beet factories and the sugarcane factory in the Khuzistan.

For pasteurized milk, Tehran's population of over a million persons has depended on private plants with a capacity of only about 50,000 quarts daily. In November 1957, a new plant, the joint project of UNICEF (U. N. Children's Fund) and the Plan Organization, opened. Its capacity is 50,000 to 60,000 quarts, but it is now operating at about 50-percent capacity, the limiting factor being the supply of raw milk. With a potential market in Tehran of at least 200,000 quarts daily, there is a possibility that dry milk may be imported in substantial quantities.

Another industry that the Plan Organization is aiding is fruit drying and processing.

Distribution of Crown Lands.—An important factor in agricultural development in Iran has been, and will be, the distribution of state and crown lands to individual farmers. The Reza Shah had accumulated vast holdings during his reign—more than 2,000 villages and 2,000 parcels of pasture lands. In 1950, the present Shah decreed that crown lands would gradually be sold on long terms⁷

⁷ Price was 10 times the annual rent, less 20 percent, to be paid over a 25-year period with no interest.

and distributed among the tenants occupying the land. Proceeds from the sale were to be devoted to productive projects and the foundation of credit societies for the benefit of the villagers.

The first distribution program—12 villages on the Varamin Plain near Tehran—ran into difficulty because the tenants were not prepared to assume the responsibilities of ownership and management of farms, villages, and irrigation systems. They lacked capital and were not accustomed to making decisions themselves.

In 1952 a Development Bank was founded to assist the new small farmers financially—to provide them with cash, seed, and tools. At the same time a community development program was inaugurated and an experienced worker was assigned to each 75 families. His responsibilities were to give technical advice in the use of land and water, and in the production and marketing of crops. He was also to assist in the educational, public, and social activities of the village.

By 1957, about 500,000 acres of land had been distributed. This involved 118 villages. It is estimated that two-thirds of the crown lands will be distributed by the end of 1962. Land already distributed is concentrated in the Gorgan-Gorbad section east of the Caspian Sea, in the Varamin Plains, in Tekestan, and in the Fariman area southeast of Meshed. Blocks remaining are along the southern shore of the Caspian, in northern Kharasan near the border of the USSR, in western Kermanshah near the Iraqi border, and around Jiroff south of Kerman.

This program has not been an unqualified success in all areas; large landholders have been able to obtain sizable blocks of land in some instances, persons who were not farmers have obtained shares and then rented them, and some areas have been poorly supervised. However, on the whole, the program has worked and has been a great stride in the direction of providing the individual farmer with the opportunity of improving his lot in life.

Foreign Aid.—Since 1951 the United States has furnished substantial economic and technical assistance to Iran. Economic aid included emergency help during the critical period following nationalization of the oil industry, which contributed greatly to maintenance of political and economic stability. Technical assistance has been in programs of health, education, public administration, agricultural improvement, and industrial development.

The United Nations Technical Assistance program in Iran is one of the largest of the U. N. country programs; included are the Food and Agriculture Organization (FAO), World Health Organization (WHO), and the U. N. Children's Fund (UNICEF).

The Near East Foundation and the Ford Foundation have also been active in Iran.

The International Bank for Reconstruction and Development and the United States Export-Import Bank have extended loans. The British Government has also made loans to Iran for various projects.

Effect of Development on Competitive Products

Iran's Seven-Year Plan does not give detailed and precise goals of production and construction as do the Plans of some other countries. It is a loose collection of separate and sometimes uncoordinated projects. Therefore, it is difficult to evaluate possible results.

Progress has been slow on most agricultural development projects. Irrigation schemes especially have encountered difficulties and have fallen far short of expectations. It is doubtful that this situation will change greatly in the next 5 years, except perhaps in the Khuzistan Plain. Agricultural research and extension programs have made a good start, but the economic and cultural structure of Iran precludes rapid change in this direction.

An optimistic estimate of expansion of cultivated land in Iran in 5 years would not go beyond a 5- to 10-percent increase. However, irrigated land may increase as much as 20 percent. Most of this land will be in grains—wheat and barley. Iran does not produce enough of these grains for domestic requirements, and needs of a growing population, with some improvement in level of consumption, will absorb any increased production of these crops. Thus, Iran will not become an exporter of these grains, except in years of exceptionally good weather, as in 1957.

A substantial amount of the added farmland will be in sugar beets and sugarcane, to cut down on import requirements. Production, and thus exports, of dried fruits and nuts may increase slightly. Other food crops will also absorb some of the increased acreage.

Rice production will probably move upward as cultivation continues to develop south of the Caspian Sea and as rice is introduced into some newly irrigated areas. Exports should increase, but usual customers will be neighboring countries so this trade will not compete with the United States in its customary international markets.

Tobacco production will continue to grow and small amounts will probably be sold on the Western European markets.

Cotton is the only Iranian crop which could become a competitive problem to the United States on the world market. Iran now exports more than half its production but produces no more than 40 percent of its requirement for cotton cloth. The planned increase in the number of spindles and improvement in operating efficiency of the textile plants will probably absorb most of the increase in cotton production for a few years and possibly reduce exports.

Iran could be in a good competitive position in the world cotton market because of favorable soil and climatic conditions, coupled with a low wage scale. However, Iranian cotton has been low-quality, and the price for this quality of cotton has fallen in the world market. The Plan Organization recognizes this situation and through its Cotton Company is trying to improve the quality of the cotton through production of better and unmixed seeds. It is also improving grading and marketing of the crop. The program of pest control, especially of the spiny bollworm in the Khuzistan, will open the way for further expansion of

production. If Iran can improve the quality of its export cotton so that it will be more acceptable on the world market, it is possible that exports, and therefore production, may expand greatly.

IRAQ

Agricultural Economy

Iraq is predominantly an agricultural country. About 63 percent of the people derive their livelihood from farming or animal husbandry. With a total population of 6.5 million and an area of 107.4 million acres, Iraq is sparsely populated in relation to its natural resources and has a great potential for development.

Land Characteristics and Use

Iraq forms a rough triangle, with its apex at the Persian Gulf and its base at the border of Syria and Turkey. Iran lies to the east and Saudi Arabia and Jordan to the southwest.

The country is dominated by the Tigris and Euphrates River systems. The Euphrates, rising in the Turkish mountains, flows through Syria and into Iraq from the northwest. It has no important tributaries in Iraq. The Tigris also begins in Turkey and enters Iraq from the north. The Great Zab, Little Zab, Adhaim, and Diyala Rivers are important tributaries which come from the mountainous area in northeast Iraq. From Ramadi on the Euphrates and Baghdad (the capital city) on the Tigris, the rivers form a single low-lying alluvial valley. Farther south, the rivers are almost lost in marshes and lakes; the remaining waters unite at Qurnah and flow as the Shatt-al-Arab into the Persian Gulf.

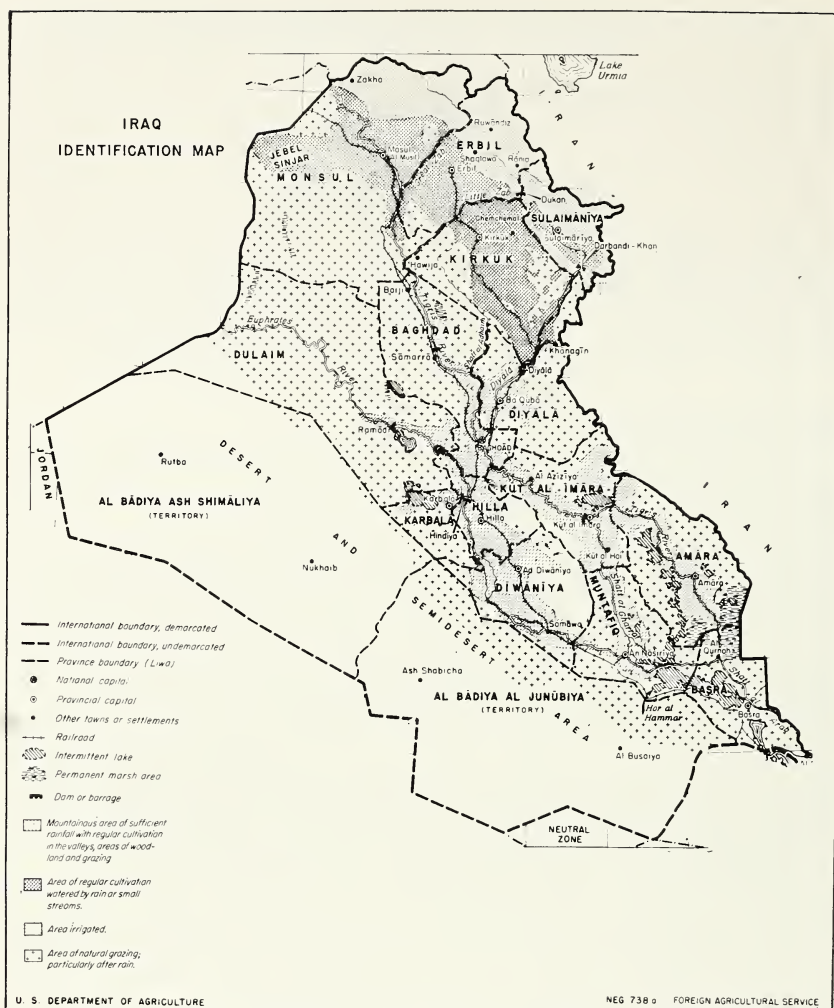
The country may be divided into three principal geographical zones:

(1) Rain-fed zone. The upland plains and mountains in the north and northeast of Iraq have sufficient rainfall to permit cultivation without irrigation. Average annual precipitation is 15 inches, falling principally between November and April. Wheat and barley are the major winter crops. Rainfall is inadequate for summer crops; however, water from streams and springs permits cultivation of some cotton, rice, and tobacco. In the mountainous section of this region, the raising of cattle, sheep, and goats by the Kurdish seminomads is the main agricultural enterprise.

(2) Irrigated zone. South of the rain-fed zone the precipitation is scanty and irregular—about 6 inches per year, which fall mainly between November and March. Temperatures average about 65° F. in winter and 110° F. in summer. Except for some seasonal grazing, agricultural production depends on irrigation.

This zone may be divided also into three regions—northern, central and southern.

The northern region includes northern Jezireh (Monsul Liwa) and the areas north of Baghdad and east of the Tigris. Almost all of this area is either unsuitable for irrigation because of elevation or configuration of the land or is awaiting irrigation development.



The central region includes the valley of the Tigris and Euphrates south of Ramadi and Baghdad, and the Diyala Valley. Here, most of Iraq's irrigation development has taken place. Along the banks of the three rivers, pump irrigation predominates; more remote areas are supplied by canals from the Hindiya Barrage on the Euphrates, the Kut Barrage on the Tigris, and the Diyala Weir. The alluvial soil of the valleys is very fertile but, because of lack of drainage during past centuries, much land has become saline. Barley is the most important winter crop, followed by wheat, lentils, flax, and vetch. Summer crops occupy about one-third as much acreage as do winter crops because of water shortage. Rice and cotton are the leading summer crops; others are sorghum, sesame, pulses, corn, and millet. Dates are widely grown and citrus fruits are important in the Diyala Valley. Iraq's major concentration of population is in this region.

The southern region—the Basra, Nasiriya, and Amara triangle—is generally

a swamp during the spring floods. Rice is the staple food crop and water buffalo the prevailing type of livestock. Along both sides of the Shatt-al-Arab is found the world's largest date palm belt. Basra is Iraq's only port.

(3) Desert zone. To the south and southwest lies the vast arid zone which comprises 40 percent of the total land area. This zone is sparsely inhabited by roaming nomads, who raise camels, goats, and sheep.

Utilization and Potential for Development.—As a result of certain climatic, economic, and social obstacles, only a small part of Iraq's land is cultivated each year, but much of the remainder is usable.

TABLE 10.—*Land use: Iraq, 1956* ¹

Use	Area	Percent of total
	<i>1,000 acres</i>	<i>Percent</i>
Agricultural land	15, 646	14. 3
Arable lands:		
Fallow and orchard	13, 484	12. 3
Permanent pastures	2, 162	2. 0
Forest and woodlands	4, 374	4. 0
Unused but potentially cultivable	29, 899	27. 2
Built-on areas, wasteland, and other	59, 793	54. 5
Total area	109, 712	100. 0

¹ Estimated.

The following breakdown of cultivable area by use and zone gives an idea of potential for development:

	<i>Percent</i>
Percent of total area which is cultivable	42
Percent of cultivable land which is in the—	
Irrigation zone	67
Rain-fed zone	33
Percent of cultivable land which is—	
Under cultivation	30
Permanent pasture	5
Unused at present	65
Percent of area under cultivation which is—	
Actually in crops	64
Fallow	38
Percent of area actually in crops which is in the—	
Irrigation zone	68
Rain-fed zone	32
Percent of area actually in crops which is in—	
Winter crops	75
Summer crops	18
Orchards	7
Percent of irrigated area served by—	
Flow systems	54
Pumps	38
Water wheels and other means	8

Agrarian Structure.—Land ownership in Iraq is very complicated and confusing, with the state retaining the ultimate legal title to nearly all land.

This situation has an important bearing on agricultural development. With the bulk of the vacant but potentially productive land under state ownership, land reclamation and distribution programs have been facilitated.

In 1932 the government began a cadastral survey, and by 1951, 47 percent of the land was surveyed. These types of land tenure are recognized:

	<i>Percent of area surveyed</i>
Mamlukah (mulk); land held in absolute private ownership.....	0.3
Matroukah; land reserved for public purposes.....	3.4
Mawqufah (waqf); land held in trust for benefit of religious institutions or individuals.....	1.2
Miri-tapu; land held in permanent tenure from state, with holder able to sell, mortgage, or will it to others.....	18.0
Miri-lazma; same as Miri-tapu, except state may veto transfer.....	16.0
Miri-sirf; land belonging absolutely to the state.....	61.6

The 1952-53 Agricultural Census gave the following distribution of holdings by size in Iraq:

<i>Size (in meshara) ¹</i>	<i>Number of holdings</i>	<i>Percent</i>
Under 4.....	24,270	19.4
4-20.....	25,849	20.7
20-100.....	41,905	33.6
100-600.....	27,555	22.0
600-2000.....	3,549	2.8
2000-20,000.....	1,813	1.4
Over 20,000.....	104	.1
Total.....	125,045	100.0

¹ A meshara is equal to $\frac{1}{4}$ hectare, or 0.62 acre.

Crop and Livestock Production

Crops.—The winter grains, wheat and barley, are the most important crops in Iraq. Some flax and pulses are also produced during the winter. Summer crops of significance are rice and, more recently, cotton. Other crops include millet, corn, grain sorghum, pulses, and sesame. In the mountainous section of the north, tobacco is of importance.

Iraq is the world's principal producer of dates. Production of citrus and other fruits, nuts, and vegetables is expanding.

The index of agricultural production (1952-54 base) shows a substantial increase over prewar. (The drought of 1955 is reflected in the low index of that year, as is the highly favorable weather of 1957 in that year's index.)

1935-59.....	62
1952-54.....	100
1955.....	83
1956.....	100
1957.....	118

TABLE 11.—*Principal crops: Area and production in Iraq, averages 1935–39, 1946–50, and 1951–55, annual 1956 and 1957*

Crop	Area					Production				
	Average			1956	1957	Average			1956	1957
	1935–39	1946–50	1951–55			1935–39	1946–50	1951–55		
Winter crops:	<i>1,000 acres</i>	<i>1,000 acres</i>	<i>1,000 acres</i>	<i>1,000 acres</i>	<i>1,000 acres</i>	<i>1,000 m. t.²</i>	<i>1,000 m. t.</i>	<i>1,000 m. t.</i>	<i>1,000 m. t.</i>	<i>1,000 m. t.</i>
Barley	1, 977	2, 567	2, 582	2, 780	3, 064	583	703	920	1, 000	1, 305
Wheat	1, 816	2, 278	2, 921	3, 398	3, 598	541	375	669	650	1, 118
Summer crops:										
Rice	393	600	250	225	173	148	273	127	200	111
Cotton	52	35	148	146	156	2.5	7	5	7	8
Millet	(¹)	99	40	(¹)	(¹)	(¹)	13	13	30	30
Corn	(¹)	67	20	17	17	150	16	7	8	6
Sesame	(¹)	94	54	(¹)	42	(¹)	10	13	15	12
Tobacco	4	12	17	20	20	5	4	6	6	5
Dates	(¹)	465	(¹)	(¹)	(¹)	300	275	356	253	225

¹ Not available.

² One metric ton equals 2,205 pounds.

Livestock.—Iraqi farmers generally do not raise both crops and livestock; many peasant farmers have only one or two horses or buffaloes for draft animals. Sheep and goats are the most numerous livestock because they thrive despite poor grazing. These and camels are kept by the pastoral nomads, who depend heavily on livestock products for food, clothing, and shelter. In the irrigated

TABLE 12.—*Livestock: Number in Iraq, average 1935–39, annual 1950, 1955–57*

Livestock	Average 1935–39	1950	1955	1956	1957
	<i>1,000 head</i>	<i>1,000 head</i>	<i>1,000 head</i>	<i>1,000 head</i>	<i>1,000 head</i>
Sheep	7, 090	7, 490	9, 000	8, 500	9, 221
Goats	2, 224	1, 754	2, 250	2, 500	2, 500
Cattle	374	1, 035	1, 720	1, 910	1, 900
Camels	(¹)	279	(¹)	(¹)	(¹)
Buffalo	(¹)	200	(¹)	(¹)	(¹)
Horses	(¹)	184	(¹)	(¹)	(¹)
Donkeys	(¹)	326	(¹)	(¹)	(¹)
Poultry	(¹)	6, 000	(¹)	(¹)	(¹)

¹ Not available.

1950 data, *The Economic Development of Iraq*, International Bank for Reconstruction and Development, 1952. Other years, U. S. Dept. Agr.

areas, cattle and buffaloes predominate. Buffalo milk, which has almost double the butterfat content of dairy cow's milk, is widely used in the cities of Iraq. Some poultry are found on farms but there are very few commercial enterprises.

Technology.—Most of the land is tilled for the landlord by peasants (fellahin) for a share of the crop. Most tenants have no choice in the use of the land; the landholder or his agent assigns the land to be cropped, the crop to plant, and even the method of operation.

Agricultural techniques are little different from those used for centuries in Iraq. About half the winter crop area is left fallow to build up fertility; however, this grows up to weeds and is pastured, so the system is not very effective. Plowing is with the ancient wooden plow and harvesting is by hand. Little animal manure or commercial fertilizer is used on the land; most animal dung is used for fuel. Crop rotation does not include soil-building crops, so crop yields are low.

Poor drainage has caused much of the irrigated land to become saline, thus reducing productivity and even resulting in the abandonment of some areas. This factor was probably an important cause of the decline of civilizations in this area in the past.

Because of inadequate feeding, poor breeding, disease, and insufficient shelter, the productivity of livestock is low compared to Western standards but is higher in Iraq than in most neighboring countries.

Marketing facilities for agricultural products are rather inadequate in Iraq. It is only recently that small grain silos were constructed in Baghdad and Basra. These will accommodate only about 10,000 tons; the rest must be stored in sheds or in the open. Tenants store almost no grain; they are in debt and must sell at harvest.

Situation in the World Agricultural Market

Pattern and Competitive Aspects

Iraq's principal agricultural exports are cereals, dates, and animal products. In all, agricultural products make up 85 to 90 percent of the value of exports, other than oil. Barley has consistently been the most important exchange earner (after oil). Some wheat is exported after years of favorable weather in northern Iraq, and small quantities of millet, rice, corn, and pulses are also shipped. During the early 1950's, cotton became important. Carpet wool, live animals, hides and skins, and sheep casings are the major exports of livestock products.

Iraq products almost half the world's dates, and exports about 70 percent of its crop. Its exports represent over 75 percent of world trade. Thus, fluctuations in Iraq's date crop have a strong influence on the world price.

The country is largely self-sufficient in agricultural products; the only important imports are tea and sugar, but in years of poor grain harvests, some wheat and flour are brought in. Coffee, fruit, dairy products, animal fats, and vegetable oils are imported, too.

Over half of Iraq's foreign trade is with Western Europe, where the United

Kingdom is the principal customer and supplier. Neighboring Arab countries are important customers but Iraq receives little agricultural products from them. The United States is a large supplier of commodities other than agricultural, and buys substantial petroleum, dates, and livestock products. There is little trade with the Soviet area. Other important suppliers include Ceylon (tea), Japan (textiles), and India (tea and textiles). India also buys substantial quantities of dates from Iraq, but in 1956 placed quota restrictions on them.

TABLE 13.—*Principal agricultural commodities: Exports from Iraq, averages 1946–53, annual 1954 and 1955*

Commodity	Average				1954		1955	
	1946-50		1951-53					
	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value
	<i>Metric tons</i>	<i>1,000 dollars</i>	<i>Metric tons</i>	<i>1,000 dollars</i>	<i>Metric tons</i>	<i>1,000 dollars</i>	<i>Metric tons</i>	<i>1,000 dollars</i>
Barley	263, 738	14, 197	422, 487	27, 840	489, 847	24, 706	320, 756	16, 663
Wheat	13, 927	1, 202	15, 067	1, 427	28, 863	1, 265	70, 196	4, 719
Millet	11, 510	808	15, 253	998	14, 608	701	21, 329	671
Rice	2, 356	285	4, 002	488	6, 152	654	3, 914	331
Dates	200, 335	11, 948	275, 120	13, 510	217, 887	9, 982	248, 969	8, 018
Wool (dirty)	5, 364	2, 414	5, 021	3, 685	4, 783	2, 335	5, 737	3, 638
Cotton (lint)	1, 501	917	3, 020	3, 082	1, 186	812	3, 313	1, 817
Seeds	1, 011	748	13, 401	1, 465	5, 031	938	8, 869	1, 304
Live animals		1, 220		2, 792		4, 375		1, 177
Hides and skins	1, 915	729	1, 322	810	1, 117	763	1, 629	671
Sheep casings		236		554		416		594

TABLE 14.—*Principal agricultural commodities: Imports into Iraq, averages 1946–53, annual 1954 and 1955*

Commodity	Average				1954		1955	
	1946-50		1951-53					
	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value
	<i>Metric tons</i>	<i>1,000 dollars</i>	<i>Metric tons</i>	<i>1,000 dollars</i>	<i>Metric tons</i>	<i>1,000 dollars</i>	<i>Metric tons</i>	<i>1,000 dollars</i>
Tea.....	5, 830	5, 892	10, 060	11, 530	12, 667	17, 868	16, 304	22, 687
Sugar.....	58, 096	7, 918	89, 299	16, 005	120, 239	14, 967	123, 385	14, 757
Coffee.....	(1)	(1)	(1)	(1)	685	1, 061	710	886
Fruit.....	(1)	(1)	(1)	(1)	(1)	633	(1)	807

¹ Not available.

TABLE 15.—*Direction of trade: Exports by country of destination and imports by country of origin, Iraq, 1954 and 1955*

Country	Exports				Imports			
	1954		1955		1954		1955	
	<i>1,000 dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Percent</i>
U. S. A. ¹	2, 081	4. 1	1, 708	3. 8	28, 889	14. 2	41. 118	15. 1
Arab countries ²	11, 878	23. 6	10, 584	23. 7	7, 649	3. 7	4, 316	1. 6
Western Europe.....	30, 171	60. 0	25, 027	56. 2	111, 147	54. 6	142, 017	52. 2
Soviet area.....	127	.3	18	(³)	5, 439	2. 7	8, 197	3. 0
Others.....	6, 070	12. 0	7, 232	16. 2	50, 390	24. 8	76, 397	28. 1
Total ⁴	50, 327	100. 0	54, 568	100. 0	203, 514	100. 0	272, 045	100. 0

¹ Iraq's exports to the United States shown here are only about 15 percent of the value shown in U. S. trade statistics as imports from Iraq (excluding oil). This is largely because many exports from Iraq are designated by a country of reshipment rather than a country of final destination. ² Including Iran. ³ Less than 0.05 percent. ⁴ Excluding oil.

Competitive Exports.—The only Iraqi product which offers significant competition to United States farm exports is barley, although small quantities of wheat and cotton from Iraq are sold on the Western European market. Princi-

TABLE 16.—*Exports: Principal commodities from Iraq competitive with U. S. farm exports, by principal countries of destination, 1954 and 1955*

Commodity and country	1954	1955
	<i>1,000 metric tons</i>	<i>1,000 metric tons</i>
Barley:		
West Germany.....	130	88
Denmark.....	93	88
Netherlands.....	164	48
Belgium.....	51	26
United Kingdom.....	38	13
Bulgaria.....	0	13
Saudi Arabia.....	3	12
Italy.....	2	11
Wheat:		
Italy.....	3	19
United Kingdom.....	16	17
Netherlands.....	1	8
Lebanon.....	6	8
Cotton:		
United Kingdom.....	.8	1.9
Netherlands.....	.3	1.0

pal customers for Iraqi barley are West Germany, Denmark, the Netherlands, Belgium, and the United Kingdom. In these markets it competes with United States feed grains.

Trade Policies.—In January 1956 the Iraqi Government revised its tariff law. Duties on essential commodities, raw materials, and agricultural products were reduced. Rates were increased on luxury items and commodities competitive with certain domestic production, such as vegetable oils and dairy products.

Iraq has a high level of foreign exchange earnings, including dollars; therefore, it has pursued a liberal policy toward imports from dollar areas. The limiting factor on imports from the United States is price rather than import controls. Imports for nondollar areas are placed in three categories: Prohibited, limited allocations, and unlimited allocations. Prohibited goods include low-count cotton yarn, live animals, meat, ghee, corn, beans, and onions. Under limited allocations are cotton cloth and canned milk.

As for its exports, Iraq is having difficulty with the huge barley surplus which accumulated from the 300,000 metric tons carried over from 1956, as a result of the Suez conflict, and the high production in 1957. The government tried to encourage foreign sales by granting an export subsidy of one Iraqi dinar (\$2.80) per metric ton of barley exported in lots of 100 tons or more, between July 29, 1957, and February 1, 1958. But almost 900,000 tons are still on hand.

On exports of wheat and rice, there was a government ban but bumper crops in 1957 caused growers and exporters to press for its removal. Wheat was released in January 1958, but exports are still allowed only under individual license for each shipment.

The Iraq Date Association allocated foreign markets and regulated prices to growers in both the central and Basra areas until 1957. That year, it was discontinued in the central area, and a free market allowed to operate there.

Trade With the United States

Agricultural trade between the United States and Iraq is highly in favor of Iraq; the United States imports almost \$14 million worth of agricultural products, but exports only about \$1 million. On the other hand, the total trade balance has usually been in favor of the United States. Nonagricultural exports to Iraq represent 98 percent of the total, whereas, until the last 2 years, less than 20 percent of United States imports were nonagricultural. The recent increase in other imports was from oil purchases in 1955, 1956, and 1957.

The only agricultural commodities of any significance that the United States exports to Iraq are dairy products and animal fats. Principal imports are carpet wool, dates, sausage casings, and licorice root.⁸

⁸ It is not possible to determine how important the United States is as a customer for these products. According to Iraqi statistics the United States proportion is small; however, United States statistics show imports (in 1955) of carpet wool from Iraq 2½ times the total value of Iraq's exports of wool.

TABLE 17.—United States-Iraq trade: Value of exports, imports, and trade balance, averages 1935-54, annual 1956 and 1957

Items	Average					
	1935-39	1940-44	1945-49	1950-54	1956	1957
U. S. exports to Iraq:	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Agricultural.....	(¹)	2, 100	500	606	780	1, 107
Nonagricultural.....	2, 256	36, 633	10, 809	20, 597	35, 624	38, 906
Total.....	2, 256	38, 733	11, 309	21, 203	36, 404	40, 013
Percent agricultural.....	0	5	4	3	2	3
U. S. imports from Iraq:						
Agricultural.....	4, 100	4, 300	7, 200	11, 800	14, 610	13, 524
Nonagricultural.....	474	705	1, 959	2, 702	25, 222	15, 453
Total.....	4, 574	5, 005	9, 159	14, 502	39, 832	28, 971
Percent agricultural.....	90	86	79	81	37	47
Trade balance in favor of U. S. ²	2, 318	33, 728	2, 150	6, 701	—3, 428	11, 036

¹ None or negligible. ² Minus sign denotes excess of U. S. imports over exports.
U. S. trade statistics.

TABLE 18.—U. S. agricultural exports to Iraq: Quantity and value, 1956 and 1957

Commodity	Quantity			Value	
	Unit	1956	1957	1956	1957
		<i>Thou-</i>	<i>Thou-</i>	<i>1,000</i>	<i>1,000</i>
		<i>sands</i>	<i>sands</i>	<i>dollars</i>	<i>dollars</i>
Dairy products.....	Pound.....	1, 978	3, 774	405	754
Tallow, inedible.....	do.....	2, 317	1, 787	222	189
Inedible animal greases and fats.....	do.....	220	46	26	7
Grains and preparations.....				46	22
Vegetables and preparations.....	Pound.....	97	133	11	21
Vegetable seeds.....	do.....	20	40	17	32
Food for charity or relief.....				1	0
Other agricultural commodities.....				52	82
Total agricultural.....				780	1, 107
Nonagricultural.....				35, 624	38, 906
Total exports.....				36, 404	40, 013

U. S. trade statistics.

TABLE 19.—*U. S. agricultural imports from Iraq: Quantity and value, 1956 and 1957*

Commodity	Quantity		Value	
	1956	1957	1956	1957
	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Sausage casings.....	235	119	1, 111	707
Hides and skins, raw.....	227	287	123	138
Dates.....	38, 708	38, 310	3, 149	3, 815
Licorice root.....	19, 350	17, 185	678	629
Wool, unmanufactured, free.....	12, 873	10, 984	9, 229	7, 929
Wool, unmanufactured, dutiable.....	381	272	274	180
Animal hair, unmanufactured.....	107	126	42	96
Other agricultural commodities.....			4	30
Total agricultural.....			14, 610	13, 524
Nonagricultural.....			25, 222	15, 453
Total imports.....			39, 832	28, 977

U. S. trade statistics.

Agricultural Development

History and Recent Progress

Irrigation has been practiced in the area that is now Iraq since the dawn of history and reached a fine art during several periods. This area was one of the great granaries of the ancient world and supported a large population. Agricultural production probably reached one of the high levels under the Abbasid caliphate. This empire was destroyed by the Mongol invasion in the 13th century, and the irrigation network was allowed to fall into ruin. In the generations which followed, foreign conquerors did little to restore the agriculture of the valleys of the Tigris and Euphrates Rivers.

In 1921, when the Kingdom of Iraq was created out of three former Ottoman provinces, it was largely a land of seminomadic tribes and barren deserts. Most of the ancient irrigation canals were dry and the land unplowed.

The first efforts for development in the new country were toward flood control, irrigation, and drainage. The great rivers—Tigris and Euphrates—are both a blessing and a curse. They bring water to the semiarid valley but they also bring disastrous floods. (In 1954, an area of 1.4 million acres was inundated, some 50,000 head of livestock were destroyed, and about 150,000 persons were driven from their homes. Baghdad narrowly escaped the flood.) These rivers also tend to wander across the plains, periodically shifting their courses, so that the southern parts of the valleys are crisscrossed by old river beds and filled with swampy lakes.

Some of the earliest flood control and irrigation projects were (1) the Hindiya Barrage on the lower Euphrates (1911-13), which brought 445,000 acres of land under irrigation; (2) an escape-channel from the Euphrates to Lake Habbaniya, to carry excess flood waters to the natural depression in the desert, begun in 1913 and completed in 1950, except for the Ramadi Barrage which was not finished until 1955; (3) the Kut Barrage on the Tigris, completed in 1939 and furnishing water for 2.2 million acres; (4) the Diyala Weir, on the tributary of the Tigris, erected in 1939 and controlling the whole irrigation system of the Diyala Province.

Current Development Programs

Few underdeveloped countries are in such a favorable circumstance as Iraq is, to embark on a program of agricultural development. The population is sparse relative to the land now under cultivation, and there are millions of acres of productive land which may be developed. The country has two great rivers waiting to be tapped for water to supply the soil, and it has conveniently located storage basins, both in the Mesopotamian Valley and in the mountains, to save this water during the flood season for use in the summer. Oil has provided the means to carry out the most elaborate development plans.

In 1950 the Iraqi Government passed a law allocating 70 percent of oil revenues received by the government for economic development. Then it invited the International Bank for Reconstruction and Development to survey the country and make recommendations for development. This survey was completed early in 1951 and included recommendations in the following general fields:⁹ Irrigation and drainage, agriculture and forestry, industry, transport and communications, public health, community planning, education, and public administration.

In 1951 the Iraqi Government initiated a Five-Year Program of Development under a Development Board, based, to a large extent, on the Bank's recommendations. During the period 1951/52-1955/56, the Board's budget amounted to ID 155.4 million (\$435 million).¹⁰

In April 1955 (one year before the end of the first period) the program was reorganized and a Second Five-Year Program set up to run from 1955 through 1959. Reasons for revision: (1) Cost estimates were no longer realistic; (2) a law in 1953 changed the bases for financing and created the Ministry of Development to carry out the development projects of the Board, and (3) the Board wanted more latitude in programing. The budget set aside for this period was ID 304.3 million (\$850 million).

The British economist, Lord Salter, made a study of the Board's plans and recommended (1) administrative reorganization, (2) impact programs—such as

⁹ *The Economic Development of Iraq*, International Bank for Reconstruction and Development, 1952.

¹⁰ One Iraqi dinar is equal to \$2.80.

housing, pure water systems, and agricultural improvement—in order to do something quickly for the people and gain popular support, and (3) top priority for agriculture, around which the economy should be developed. He suggested reorganizing and strengthening the Ministry of Agriculture, gearing water policy to agricultural needs once flood control was assured, and transferring the Miri Sîrf Department (control of state lands) back to the Ministry of Agriculture. Several of his recommendations have been or are being put into effect.

Six-Year Development Program.—The Second Five-Year Program was also revised. In May 1956, it became a 6-year program, to run until March 1961, and its budget was increased to ID 500.0 million (\$1.4 billion).¹¹

TABLE 20.—*Development programs: Amounts allocated for major and minor projects, Iraq*

Projects	6-year 1955-60	Second 5-year 1955-59	First 5-year 1951-55
	<i>Million dinars</i>	<i>Million dinars</i>	<i>Million dinars</i>
Major projects:			
Irrigation, drainage, flood control.....	153.8	107.9	53.4
Roads and bridges.....	86.6	53.7	26.8
Airports.....	8.9	5.0	2.2
Railways.....	24.9	15.5	.....
Ports.....	4.0	.....	.....
Principal buildings.....	39.8	22.6	16.4
Housing.....	24.0	6.0	1.6
Industry, mining, electric power.....	67.1	43.6	31.0
Agriculture, wells, animal husbandry.....	14.3	6.5	11.6
Minor projects:			
Building and establishments.....	59.4	32.2	.....
Miscellaneous projects.....	9.9	5.9	9.2
Administration and services.....	7.3	5.4	3.2
Total.....	500.0	304.3	155.4

The expected revenues total ID 390.1 million over the 6-year period. The deficit of ID 109.9 million is planned to be met by surpluses and by increases in oil revenues.

<i>Source of revenue</i>	<i>Total for 6 years 1,000 ID</i>
Oil revenue.....	385,081
Proceeds of Tharthar Project Loan.....	39
Miscellaneous.....	170
Interests.....	4,760
Total.....	390,050

The Development Board is responsible for formulating the development

¹¹ On July 14, 1958, the Iraq Government was overthrown as the result of a military coup. There is no indication that the new regime will make fundamental changes in the current development program.



In semiarid Iraq, irrigation water is essential for crop production. That country's development program stresses flood control and irrigation. In fact, over 30 percent of the development budget is devoted to these projects.

programs, but the actual execution of the projects is by the Ministry of Development or other Ministries or both.

Irrigation, Flood Control, Artesian Wells, Drainage.—Controlling and using the waters of the Tigris and Euphrates River is the central problem of development of Iraq; therefore, about 30 percent of the Board's budget is devoted to these projects. The overall, long-range plan is to redistribute the seasonal flow of the two rivers so as to prevent flooding and to provide water for additional land. This will be accomplished by the building of 10 dams and related irrigation and drainage canals.

The proposed projects will provide enough water to increase the supply on 8.1 million acres now under partial irrigation and to eventually irrigate 5.6 million acres of new government land. Of this new land, 4 million acres are located along the Tigris and 1.6 million along the Euphrates. This would be a 65-percent increase in area under cultivation and would increase greatly the area in summer crops.

The most important projects are these:

(1) Wadi Tharthar project. The Samarra Barrage was completed in 1956

and diverts the flood waters of the Tigris River to the Tharthar depression. There is some question whether the stored water can be returned to the river for irrigation. The project cost \$44.8 million, but prevented a probable flood in 1957.

(2) Habbaniya project. The Ramadi Barrage on the Euphrates was completed in December 1955, but water has been diverted to Habbaniya Lake since the regulator and canal were completed in 1951. Lake Habbaniya stores water for irrigation along the lower Euphrates.

(3) Dukan Dam. This flood control and water storage project is being constructed on the Little Zab River, a tributary of the Tigris. This reservoir will supply additional water along the Tigris. Later, it is planned to develop a large irrigated area between the Little Zab and the Adhaim, requiring the construction of the Batma Barrage now under study. It is estimated that this system will bring an additional 600,000 acres of new land under irrigation.

(4) Darbandi Khan Dam. This storage dam is under construction on the upper Diyala River. It will furnish water for 300,000 acres of land. Part of this water will be for summer irrigation for the Diyala irrigated area.

Several other projects are under study. (1) The Eski Mosul Dam on the upper Tigris for flood control and storage. This probably will be built in the near future. (2) The Bakhma Dam on the Great Zab. There is a question of economic feasibility of this dam. If it is determined that water from the Tharthar depression can be utilized, other storage projects on the tributaries of the Tigris may not be carried out. (3) The Damir Qapu Barrage on the Adhaim River. (4) The Gharraf Regulators in Kut. (5) The regulators on the lower Euphrates.

There are additional proposed dam, or barrage, sites but they are not under serious study as yet.

Iraqi technicians have finally been convinced of the importance of drainage as a partner to irrigation development. New lands must have drainage systems constructed at the same time as the irrigation systems. Some old irrigated areas, such as the Dujaila, Saqlawiyah, and Abu Ghuraib, are being provided with drains.

Another important project is the drilling of artesian wells in the desert, so that surrounding land may be utilized for settlement of nomadic tribes. One hundred wells have been drilled, and the program provides for drilling 200 more. The Ministries of Social Welfare and Health have also had some well drilling projects.

Industries Processing Agricultural Products.—The development programs have expanded or modernized several industries that are directly related to agricultural development. A new cotton textile factory at Mosul has been completed and will produce an estimated third of the domestic consumption of cotton goods. Iraq has been producing one-third of its textile needs and importing the remainder. This mill should utilize about 4,000 metric tons of cotton—more than Iraq is now exporting.

A sugar plant is under construction—also at Mosul. It will produce 35,000

metric tons of refined sugar annually—10,000 tons from domestic sugar beets and 25,000 tons from imported raw cane sugar. A second plant in Karbala will produce 8,000 tons of liquid sugar and 9,000 tons of date sirup. Another plant is being considered in the Sulaimaniya Liwa, where sugar beet production is expected to expand.

A dairy processing plant is being constructed at Abu Ghuraib, near Baghdad. This has a capacity of 40,000 quarts of milk and a ton of butter daily. It is planned that all herds of milking buffaloes and cattle, presently scattered throughout Baghdad, will be concentrated at this spot and all milk will be distributed through the plant. However, this project has not moved as rapidly as expected. The building has been completed for some time but the machinery has only recently been installed.

Finally the possibility of producing animal feed from dates is being considered by the Development Board.

Other Development Plans.—In spite of the fact that the economic life of Iraq depends largely on agriculture, little effort has been made in the past generations



Iraqi farmer uses this simple device to treat his seed wheat for smut. Prominent in Iraq's plans for agriculture are disease and pest control and crop improvement.

to improve farming techniques. In fact, it was not until 1952 that the Ministry of Agriculture was established.

To provide funds for agricultural improvement, the Development Board included ID 12 million (\$33.6 million) in its program for agriculture and forestry. The execution of projects approved by the Board is entrusted to specialists of the Ministry of Agriculture under the supervision of the Ministry of Development.

Twenty-seven projects had been approved by the Development Board by June 1957 for soil surveys and land classification, reforestation, control of insect pests, crop and livestock breeding, and improvement of facilities at the College of Agriculture and the College of Veterinarian Medicine.

After 2½ years, little has been accomplished on most of these agricultural projects. Less than 10 percent of the money appropriated has been spent. Part of the difficulty lies in the very newness of agricultural improvement programs in Iraq. The Ministry of Agriculture itself is new, and some of the technical sections are too. Staffing this organization with competent technicians has taken time. Also, many of the proposed projects were just ideas without the necessary background planning. After approval by the Board, projects need to be planned and implemented.

Even after these programs get under way, reaching the individual farmer and changing his traditional methods of farming will take a long time. It is doubtful that within the next 5 to 10 years agricultural production will increase significantly through improved practices.

Development of Miri-Sirf Land.—Because of the high incidence of tenancy, the unsettled living conditions of a great many of the farmers, and the difficulty of the individual farmer in obtaining and developing land of his own, the Government of Iraq decided that, as Miri-Sirf land (state land) was reclaimed, it should be divided into small units of 60 to 100 acres and distributed free among farmers. Certain conditions of use were stipulated and, if fulfilled by the settler, the land became his property after 10 years.

The Dujaila Land Development Law was enacted in 1945, and the Dujaila area on the lower Tigris (Kut Liwa) was selected for the pilot project. This program was considered successful, and in 1951 all Miri lands in the country were placed under the provisions of this law. Eligibility of settlers was expanded to include army pensioners, civil employees, and students.

Funds for development come from the General Budget and the Development Board's Budget. Funds for loans to settlers and for purchase of pumps and agricultural equipment come from the Board. The Board also has responsibility for laying out the necessary irrigation and drainage systems. Selection of the settlers and supervision of the agricultural development and operation belong to a Miri Lands Commission.

In the Dujaila project, 1,576 settlers had been granted units of 50 to 60 acres between 1945 and 1955. This comprises an area of about 100,000 acres, most of which is flow irrigated.

The second project was the lands of Hawija (Kirkuk Liwa), where 297 units have been distributed since 1951. Size of unit has been reduced to about 40 acres. This area is being expanded.



Farmers and officials gather for the drawing, by lot, for farm plots in one of Iraq's land settlement projects. Distribution of land to farmers is an essential part of Iraq's program to develop agriculture.

In the Shahnazoun (Sulaimaniya Liwa) project, 750 units have been granted. In the Latifiyah area (Hilla Liwa), 465 settlers have been given units of about 30 acres. In Hilla, 600 families have been settled and in Dulaim, 130 families.

Two additional flow-irrigated areas are being developed in the Hilla Liwa at the present time—Greater Mussayeb and Babel. Each of these includes about 250,000 acres of land. Another project in progress in Hilla Liwa—Zubadia—is to be irrigated by high pumping. Three areas in the rainfall zone have been developed—Sinjar, Shorah, and Makhmour.

Future plans include the reclamation of close to another 4 million acres of land. Important new areas are Mosul, Kut, Baghdad, Diyala, and Kirkuk.

The Miri Lands Commission has established a rural welfare program at each project to try to improve the economic, social, educational, and health standards of the settlers. Schools, health clinics, extension training programs, experimental and demonstration farms, and nurseries have been instituted. Also, light industries, such as textile plants, machine shops, smithing forges, and carpentry shops, have been introduced at the Dujaila and Latifiyah projects.

The Miri-Sirf development program has produced favorable results but it cannot be called an unqualified success. Some of the projects are small and

poorly organized and lack sufficient water for proper development. In some areas, particularly in Sinjar, large tracts of land have gone to sheikhs instead of small farmers. Granting units to nonfarmers—civil employees and veterans—has fostered absentee ownership. In the first project—Dujaila—the drainage system is inadequate and some land has already become saline. However, Latifiyah, one of the newer projects, appears to be well organized and operating successfully. The Greater Mussayeb area is now ready to be settled and appears to be well laid out.

Foreign Aid.—The United States entered into an agreement with Iraq in 1951 “to cooperate in the interchange of technical knowledge and skills and in related activities designed to contribute to the balance and integrated development of the economic resources and productive capacities of Iraq.” The present technical assistance staff consists of 71 persons and the annual budget is about \$2.5 million. Principal activities are to give technical advice on projects sponsored by the Development Board, send Iraqi technicians to the United States for study, improve the extension service, and strengthen the education system.

The Food and Agriculture Organization and other agencies of the United Nations, the Ford Foundation, and the United Kingdom also have technical aid missions in Iraq.

Effect of Development on Competitive Products

According to estimates of the Development Board 4.0 million acres of land were being cropped each year under irrigation in 1952. Plans of the Board call for this area to be increased 30 percent by 1960, 45 percent by 1965, and 130 percent by 1975. Considering the rate at which irrigation development is progressing, it is probable that such goals will be attained. In fact, some recent estimates indicate that the 1960 goal has already been exceeded.

Part of this increased area will come from reclamation of new land, but much of it will come from increased summer plantings when more water is available throughout the year. Improved drainage and the greater water supply will reduce the amount of land fallowed each season.

Increases in crop yields from improved cultivation practices, use of fertilizer and insecticides, mechanization, and crop rotations will come much more slowly. It is doubtful that significant changes will occur in the next 5 years.

Iraq's development programs do not include allocation of new land to specific crops. This will be decided by the adaptability of certain areas to certain crops and to customs and relative prices. The agricultural products which will probably be affected most greatly by increased irrigation will be grains and cotton. Iraq is already the world's largest date producer and has no plans for expanding production. Sugar production for domestic consumption will increase somewhat. Fruit—especially citrus—vegetables, peanuts, and sesame will also expand some. Iraq has excellent possibilities for improving its livestock industry; however, a complete change in farm organization would be involved in order to

TABLE 21.—*Cultivated land: Area in 1952 and Iraqi Development Board estimate of expansion, 1960, 1965, and 1975*

Items	Area in 1952 ¹	Estimated expansion		
		1960	1965	1975
	<i>1,000 acres</i>	<i>1,000 acres</i>	<i>1,000 acres</i>	<i>1,000 acres</i>
Cultivated area	12, 676	14, 381	14, 925	17, 885
Irrigated	6, 447	8, 152	8, 403	11, 656
(Percent increase)		(26)	(35)	(81)
Rain fed	6, 229	6, 229	6, 229	6, 229
Area cropped annually	6, 089	7, 373	7, 920	11, 460
Irrigated	4, 062	5, 347	5, 893	9, 434
(Percent increase)		(32)	(45)	(132)
Rain fed	2, 000	2, 000	2, 000	2, 000

¹ Adjusted from 1952-53 agricultural census.

combine livestock raising with crop farming. It will take many years to accomplish this.

Grains.—Barley is the most important winter crop in the irrigated zone because it has a greater tolerance to saline soil conditions than wheat and, in periods of water shortage, will better withstand drought. Therefore, increased production of this crop will account for a large part of the expanded irrigated area. Some of the increase will be absorbed by Iraq's rapidly growing population; however, as living standards improve, a shift in consumption from barley to wheat and other grains is expected. There may be some increase in the use of barley for livestock feed, but this practice will progress rather slowly and will not account for much of the greater barley crop.

Therefore, Iraq will have larger surpluses of barley available for export. In the past, barley exports have been marketed in Western Europe, where they competed with United States feed grains. At the beginning of 1958 Iraq had a stock of 900,000 tons and was expecting another big crop. Without some outside help it is doubtful that Iraq will be able to dispose of its surpluses. This situation may cause a shift away from barley production.

Wheat is now grown principally in the rain-fed zone. However, with improved drainage on irrigated land, it should be able to replace barley as a winter grain in certain areas. Wheat production probably will not expand faster than domestic consumption so Iraq will not have exportable surpluses except during years of favorable weather conditions. A surplus was produced in 1957 which Iraq was not able to export.

Area in rice has been reduced over the past decade. With more summer water available, there are possibilities of expanding production in some areas. Some rice will be exported but it will be of little significance on the world market.

Increased summer irrigation should also permit cultivation of more corn

and millet for food. These crops will not compete with cotton as a cash crop, so will not expand beyond local consumption needs.

Cotton.—On a percentage basis, cotton should show the greatest increase of any crop in Iraq. With sufficient water available for summer irrigation, cotton production may increase 10 to 20 times over the present level. Iraq now exports a little cotton but, as its textile industry expands in the next few years, domestic utilization will probably absorb this surplus and any increase. However, within two or three decades, Iraq may become an important cotton exporter.

Increased cotton production must include some degree of mechanization because of inadequate labor supply. This may become more acute as more farmers leave the land for the cities and oil centers.

SUDAN

Agricultural Economy

The Sudan, one of the newest independent nations, is an immense plateau in the northeast corner of Africa—of 967,500 square miles. Its most important geographical feature is the Nile River—including the Blue and White Niles—which flows the length of the country from south to north.

The Sudan is an agricultural and pastoral country whose chief wealth lies in its land and water resources. It has essentially a one-crop economy; cotton accounts for 60 to 80 percent of foreign exchange earnings. Its first census shows that its population in 1956 was 10,256,000 persons.

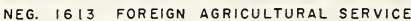
Land Characteristics and Use

The terrain of the Sudan changes from tropical forests in the south to deserts in the north, with all intermediate variations in between. It can be divided into three fairly distinct agricultural zones:

(1) The northern desert belt, which extends southward from the Egyptian border about 400 miles, where an annual rainfall of less than 4 inches confines agricultural development to the natural flooding or irrigation of the lands bordering the Nile.

(2) The wide central belt, with an annual rainfall of 4 to 19 inches, most of which falls between July and October. Rainfall is unreliable and supplementary irrigation is necessary to mature many crops. Most of the Sudan's agricultural production is found in this belt, and development plans are principally concerned with expansion of irrigation in this zone. The Gezira Scheme is the most important agricultural area in the zone.

(3) The southern belt, where rainfall varies from 20 to 47 inches per year. This is sufficient for production of most tropical plants; however, the remoteness of this area and limited transportation facilities have discouraged the development of cash crops, and farming is mainly on a subsistence level. The Sudan is only beginning to think of the development of this vast area, but it represents a great potential for the future.



Water for irrigated land may come from gravity systems (43 percent of area), pump schemes (48 percent), flood basins (4 percent), and flush irrigation on river deltas (5 percent).

TABLE 22.—*Land use: Sudan, 1956*

Use	Area	Percent of total
	<i>1,000 acres</i>	<i>Percent</i>
Cultivated land	17, 500	30
Irrigated area	2, 500	. 4
Pasture and meadow	59, 300	10
Forests	226, 000	36
Unused but potentially cultivable	98, 800	16
Wasteland and other	217, 400	35
Total land area	619, 000	100

TABLE 23.—*Irrigation areas: Sudan, 1957*

Type of system	Area
	<i>1,000 acres</i>
Gravity:	
Gezira Scheme	1, 040
Pump	1, 200
Government schemes on White Nile	45
Government schemes on main Nile	40
Guneid Scheme (government)	30
Private schemes	1, 085
Flood basins	95
Shendi basins	53
Dongola basins	42
Flush irrigation	160
Gash Delta	40- 75
Tokan Delta	0-155
Total (including average flush)	2, 400

Agrarian Structure.—Along the Nile River, land is owned by private individuals or is part of governmental development schemes. There is also privately owned land in the rainfall area, but a large part of the land there is held under tribal or village ownership.

In the Gezira Scheme, the land is owned by the government or leased by the government on a long-term basis for a fixed rent. The area was laid out in 30-acre units (now 40), disregarding former ownership patterns. Tenants are given an annual lease on a unit, with former owners in the area given first rights as tenants. Division of profits from cotton production is 44 percent to the tenant, 44 percent to the government, and 10 percent to the Gezira Board, which manages the scheme. The remaining 2 percent is assigned to a social development fund. The tenant also receives all food and feed crops produced.

On other government-managed schemes, tenure arrangements are on a co-operative basis similar to that of the Gezira.

Most private pump schemes operate on a crop-sharing basis, the pump-owner and the cultivator each taking half of the crops; but some of the larger owners charge the farmers a water rate.

Crop and Livestock Production

Crops.—Cotton is by far the most important cash crop of the Sudan. Two types are grown. Long staple (Sakel) cotton is grown in the Gezira Scheme, the Gash and Tokan Deltas, and numerous smaller governmental and private pump and flood schemes in the central region. Short staple (American) cotton is grown in the rain-fed area of Equatoria Province, the Nuba Mountains, and in certain pump schemes in the north. At least 90 percent of the cotton is long staple, 62 percent of which is produced on the Gezira Scheme.

Durra (a grain sorghum) is the staple food crop and is grown throughout the country, under irrigation and in rain-fed areas. Dukhn (bulrush millet) is second to durra as a food crop and is grown principally in southern Sudan and in flood irrigation areas. Finger millet is also important in the south.

Wheat production is small and is generally located on irrigated land near the larger cities. Small quantities of other grains are produced; barley is grown

TABLE 24.—*Principal crops: Area and production in the Sudan, averages 1934-38 and 1952-54, annual 1955-57*

Commodity	Area					Production				
	Average		1955	1956	1957	Average		1955	1956	1957
	1934-38	1952-54				1934-38	1952-54			
	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 m. t.	1,000 m. t.	1,000 m. t.	1,000 m. t.	1,000 m. t.
Cotton ¹	427	652	598	764	748	56	87	97	136	73
Durra (sorghum).....	(²)	1, 860	3, 163	2, 587	2, 778	414	566	1, 202	1, 067	1, 286
Dukhn (millet).....	(²)	1, 200	1, 679	1, 721	1, 765	25	277	340	194	142
Sesame.....	235	375	660	825	855	30	89	150	153	100
Peanuts.....	35	67	309	480	455	6	80	64	146	106
Lubia (forage).....	(²)	70	92	100	(²)	9	(²)	49	54	(²)
Wheat.....	22	27	31	25	30	7	17	17	14	20
Corn.....	11	30	35	40	35	12	16	14	20	11
Gum arabic.....						(²)	40	49	46	45
Pulses.....	(²)	14	(²)	110	125	6	58	63	61	70
Cottonseed.....						173	175	195	272	195

¹ Cotton harvest begins in December of year given.

² Not available.

on pump-irrigated land in the northern Provinces, corn is found in the north and extreme south, and rice is produced in the swampy regions of the White Nile. Other food crops are melon seeds, beans, onions, cassava, chillies, and dates and other fruits.

Sesame is the principal vegetable oil crop, some of which is exported. Peanuts are becoming increasingly important, both for domestic consumption and export. Sudan exports most of the production of cottonseed and some cottonseed oil. Castor beans are now being produced experimentally.

Lubia is the most important fodder crop, especially in the Gezira Scheme. Berseem is also grown under irrigation.

The Sudan is the world's largest producer of gum arabic. This is not a cultivated crop but is gathered from the native hashab tree.

Agricultural production has been increasing rapidly, as is shown by the following index. This is the fastest rate of increase of any country in Africa or the Middle East. The high production in 1956 was due, in part, to exceptionally good weather.

1935-39	58
1952-54	100
1955	126
1956	156
1957	149

Livestock.—Domestic animals play an important part in the agricultural economy. No census has ever been conducted but latest estimates are: Cattle, 6.9 million head; sheep, 6.9 million; goats, 5.7 million; camels, 2.0 million; donkeys, 560,000; and horses, 20,000. The practice of combining livestock and crop production in the irrigated areas is increasing.

Technology.—There is a great difference in agricultural techniques practiced in the Sudan. In the Gezira and some other irrigated projects, production practices are well advanced—including the use of mechanical equipment, fertilizers, insecticides (by airplane), and sound crop rotations. In the rain-fed area and on most small irrigated patches, cultural operations are entirely by hand. An important part of the irrigated area is still supplied by the saqia (water-wheel) and shaduf (counter-balanced dipper).

Marketing of the cotton crop is well organized but for other crops few facilities exist. The southern Provinces market little of their produce because of lack of transportation; they have a diversified, self-sufficient agriculture.

Situation in the World Agricultural Market

Pattern and Competitive Aspects

Cotton is by far the most important foreign exchange earner of the Sudan. Cotton lint and cottonseed accounted for 70 percent of total exports in 1956.

Gum arabic has been a consistent export. This is the only commodity other than cotton in which the Sudan is important in the world market. Other

TABLE 25.—Principal agricultural commodities: Exports from the Sudan, 1938, 1951, 1955, and 1956

Commodity	1938, value	1951		1955		1956	
		Quan- tity	Value	Quan- tity	Value	Quan- tity	Value
	<i>1,000 dollars</i>	<i>1,000 m. t.</i>	<i>1,000 dollars</i>	<i>1,000 m. t.</i>	<i>1,000 dollars</i>	<i>1,000 m. t.</i>	<i>1,000 dollars</i>
Cotton, raw.....	9, 745	95. 5	130, 715	94. 7	87, 132	114. 9	119, 849
Gum arabic.....	3, 156	41. 0	9, 677	41. 9	13, 431	49. 4	15, 469
Cottonseed.....	695	112. 1	10, 993	99. 9	8, 557	151. 9	13, 414
Peanuts.....	126	14. 3	2, 359	49. 9	6, 854	64. 5	10, 929
Sesame.....	574	(¹)	(¹)	25. 2	5, 148	30. 7	5, 940
Hides and skins.....	503	(¹)	3, 263	4. 7	2, 727	4. 5	2, 934
Other agricultural.....	(¹)	.....	13, 741	.....	14, 983	.....	16, 198
Total agricultural....	(¹)	.....	170, 748	.....	138, 632	.....	184, 447
Nonagricultural.....	(¹)	.....	4, 431	.....	1, 528	.....	7, 676
Total exports.....	19, 137	.....	175, 179	.....	140, 160	.....	192, 123
Percent agricultural.....	(¹)	.....	97. 4	.....	98. 9	.....	96. 0

¹ Not available.

TABLE 26.—Principal agricultural commodities: Imports into the Sudan, 1938, 1951, 1955, and 1956

Commodity	1938, value	1951		1955		1956	
		Quan- tity	Value	Quan- tity	Value	Quan- tity	Value
	<i>1,000 dollars</i>	<i>1,000 m. t.</i>	<i>1,000 dollars</i>	<i>1,000 m. t.</i>	<i>1,000 dollars</i>	<i>1,000 m. t.</i>	<i>1,000 dollars</i>
Sugar.....	1, 834	60. 1	10, 709	80. 3	9, 185	114. 3	13, 311
Coffee.....	600	5. 8	5, 524	5. 4	4, 329	7. 6	5, 512
Tea.....	761	5. 3	4, 288	7. 3	9, 110	4. 9	4, 968
Wheat flour.....	448	12. 1	2, 758	56. 2	4, 972	42. 9	3, 782
Other agricultural.....	(¹)	.....	5, 619	.....	7, 094	.....	5, 328
Total agricultural....	(¹)	.....	28, 898	.....	34, 690	.....	32, 901
Nonagricultural.....	(¹)	.....	91, 545	.....	105, 373	.....	96, 964
Total imports.....	18, 032	.....	120, 443	.....	140, 063	.....	129, 865
Percent agricultural.....	(¹)	.....	24. 0	.....	24. 8	.....	25. 3

¹ Not available.

TABLE 27.—*Direction of trade: Exports by countries of destination and imports by countries of origin, the Sudan, 1951 and 1956*

Country	Exports				Imports			
	1951		1956		1951		1956	
	<i>1,000 dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Percent</i>	<i>1,000 dollars</i>	<i>Percent</i>
United Kingdom . . .	119, 429	68. 2	63, 288	32. 9	43, 933	34. 8	36, 689	28. 3
India	20, 158	11. 5	25, 327	13. 2	19, 834	16. 5	15, 804	12. 1
Egypt	10, 911	6. 2	21, 359	11. 1	10, 996	9. 1	17, 998	13. 8
Italy	2, 695	1. 5	16, 549	8. 6	5, 410	4. 5	7, 098	5. 5
West Germany	3, 210	1. 8	13, 547	7. 1	1, 599	1. 3	5, 025	3. 9
France	4, 395	2. 5	9, 213	4. 8	1, 895	1. 6	3, 771	2. 9
United States	3, 817	2. 2	4, 152	2. 2	3, 425	2. 8	2, 947	2. 3
Netherlands	1, 738	1. 0	3, 925	2. 0	2, 017	1. 7	3, 520	2. 7
Others	8, 836	5. 1	34, 793	18. 1	33, 334	27. 7	37, 013	28. 5
Total	175, 179	100. 0	192, 123	100. 0	120, 443	100. 0	129, 865	100. 0

TABLE 28.—*Cotton: Exports of long and short staple from the Sudan by countries of destination, 1956*¹

Country	Quantity	Percent of total
Long staple:	<i>Metric tons</i>	<i>Percent</i>
United Kingdom	49, 981	49. 1
India	21, 197	20. 8
West Germany	9, 212	9. 1
Italy	7, 262	7. 1
France	3, 899	3. 8
Japan	2, 704	2. 7
Poland	1, 574	1. 5
Switzerland	1, 206	1. 2
Other	4, 740	4. 7
Total	101, 775	100. 0
Short staple:		
Communist China	3, 880	31. 9
Ethiopia	1, 686	13. 9
France	1, 097	9. 0
Italy	1, 016	8. 4
Other	4, 463	36. 8
Total	12, 142	100. 0

¹ Excluding 963 metric tons of scarto.

oilseeds—sesame and peanuts—are becoming important exports. And the Sudan exports a large number of live animals, most of which go to Egypt. Some durra is exported in good years.

Since the Sudan does not have textile mills of any significance and uses domestically only 2,000 tons of its cotton, large quantities of cloth must be imported. Cotton piece goods are the most important imports, principally from India and the United Kingdom. Major agricultural imports are sugar, coffee, tea, wheat flour, and tobacco.

The United Kingdom has been the Sudan's biggest supplier and customer, but its share has decreased since the Sudan became an independent nation. India, Egypt, and the United States are the important trading partners outside of Western Europe. Japan was the Sudan's fourth major supplier in 1957.

Competitive Exports.—The small amount of short staple cotton which the Sudan sells abroad is the only commodity which is strictly competitive with United States farm exports. The United States imports some of the Sudan's long staple cotton; but to some extent long and short staple are substitutable, and therefore this commodity provides competition with United States cotton exports in Western Europe and the Far East.

The United Kingdom is the Sudan's largest long staple cotton customer; however, the proportion of cotton exports to this country decreased from 63 percent in 1953 to 49 percent in 1956. Communist China takes the largest percentage of the Sudan's short staple cotton.

Trade Policies.—Agricultural imports are subject to controls, and import duties are levied on tobacco, sugar, tea, and coffee. Export duty on cotton is one of the principal sources of revenue of the government. The Gezira Board fixes reserve prices for the cotton exports, and private producers usually follow suit (except in 1957 when prices were too high). The government restricts the export of food crops unless there is a surplus.

Trade With the United States

Agricultural trade between the United States and the Sudan has been very small. The United States has sold some dairy products, wheat flour, and tallow from time to time. Hides and skins and cotton are practically the only significant agricultural products which the United States buys from the Sudan. Gum arabic, a forest product, is also an important United States import. Except for the war period 1940-44, balance of trade has been very much in favor of the Sudan.

Agricultural Development

History and Recent Progress

When the Sudan came under the administration of the Anglo-Egyptian Condominium at the close of the last century, agriculture was in a rather

TABLE 29.—United States-Sudan trade: Value of exports, imports, and trade balance, averages 1935-54, annual 1955 and 1956

Item	Average				1956	1957
	1935-39	1940-44	1945-49	1950-54		
U. S. exports to the Sudan:	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Agricultural.....	(1)	(2)	(2)	4	50	3
Nonagricultural.....	(1)	6, 250	1, 550	1, 631	789	4, 474
Total.....	(1)	6, 250	1, 550	1, 635	839	4, 477
Percent agricultural.....		0	0	.2	6	0
U. S. imports from the Sudan:						
Agricultural.....	(1)	700	1, 100	1, 130	1, 120	673
Nonagricultural.....	(1)	1, 424	3, 442	2, 550	2, 799	3, 039
Total.....	(1)	2, 124	4, 542	3, 680	3, 919	3, 712
Percent agricultural.....		33	24	31	29	18
Trade balance in favor of U. S. ³		4, 126	-2, 992	-2, 045	-3, 080	765

¹ Included with Egypt's statistics.

² None or negligible.

³ Minus sign denotes excess of U. S. imports over exports.

U. S. trade statistics.

TABLE 30.—U. S. agricultural exports to the Sudan: Quantity and value, 1956 and 1957

Commodity	Quantity			Value	
	Unit	1956	1957	1956	1957
Fruit cocktail.....	Pound.....	Thou- sands (1)	11	1,000 dollars (1)	2
Dairy products.....	Pound.....	36		4	0
Tallow, inedible.....	Pound.....	442		42	
Other agricultural commodities.....	Pound.....			4	1
Total agricultural.....				50	3
Nonagricultural.....				789	4, 474
Total exports.....				839	4, 477

¹ If any, included with other.

U. S. trade statistics.

TABLE 31.—*U. S. agricultural imports from the Sudan: Quantity and value, 1956 and 1957*

Commodity	Quantity		Value	
	1956	1957	1956	1957
	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>1,000 dollars</i>	<i>1,000 dollars</i>
Sausage casings	4	0	15	0
Hides and skins, raw	1, 550	1, 157	694	555
Senna	378	248	38	29
Beeswax, crude	12	33	7	18
Cotton, unmanufactured	788	9	358	5
Other agricultural commodities			8	66
Total agricultural			1, 120	673
Nonagricultural			2, 799	3, 039
Total imports			3, 919	3, 712

U. S. trade statistics.

primitive state, as was all economic life. Less than 100,000 acres were under irrigation, and the traditional saqia and shaduf were used along with flooding.

Gezira Scheme.—Soon, however, the first important development project, the Gezira Scheme, was begun. Proposed in 1904 was the irrigation of part of the triangle between the Blue Nile and White Nile Rivers, known as the Gezira Plain. After a period of experimentation, and land survey and settlement, the government approved the construction of a dam at Sennar and the necessary irrigation works. After various delays (including World War I) the Sennar Dam and a canal system to irrigate the first 300,000 acres were completed and opened in 1925. The Sudan's share of the water from the Sennar Dam was limited by the Nile Waters Agreement of 1929 to the maximum discharge in the Gezira main canal during periods of surplus and to a fixed volume of water (992 million cubic meters—the contents of the dam) at other periods.

Between 1925 and 1950 the development and operation of the land in the Gezira Scheme was on a three-way partnership basis—the government, the tenant, and the concession companies. The government rented the land and provided the irrigation works, and the management of the project was turned over to two companies—the Sudan Plantation Syndicate and the Kassala Cotton Company—under a 25-year concession. In 1950 the scheme was nationalized under a management board called the Sudan Gezira Board, which is responsible to the government and has continued the management of the project.

At the present time the canalized area of the Gezira amounts to about a million acres, of which 255,000 are annually in cotton, about 125,000 in grain (durra), and 50,000 in fodder and vegetables. At least half of the land is in fallow each year. There are over 30,000 cultivators operating land in the scheme.

The Gezira Scheme has been highly successful economically and socially. It has been the backbone of the Sudanese economy, accounting for 58 percent of the cotton crop, which in turn supplies 60 to 80 percent of the foreign exchange. Annual contributions to the central treasury have enabled the government to undertake development in other areas and other fields and to maintain many social services throughout the country.

The cultivators have undergone a tremendous change in shifting from a semi-nomadic group to settled farmers using modern farming techniques.

Other Irrigation Schemes.—A number of other areas have been developed by irrigation in the Sudan. One of them gets its water under the White Nile Scheme, established by the government to compensate for land lost through the construction of the Jebel Aulia Dam (completed in 1937 to supply water to Egypt). This is a series of eight pumping stations which irrigate 45,000 acres.

Along the main Nile in the northern part of the Sudan, the government has established 10 pump schemes to replace the ancient water wheels and serve as models for private development. Farms here vary from 2,000 to 6,000 acres in size and are operated cooperatively.

The Guneid Pump Scheme was completed in 1956 and is believed to be the largest of its kind in Africa. The project is located along the east bank of the Blue Nile, opposite the Gezira, and irrigates over 30,000 acres of land.

Flush water from seasonal torrents is used to irrigate three other schemes, all run as copartnerships between the government and the cultivators. These are the delta of the Gash River, the Tokar Delta of the Khar Baraka River, and a small area watered by the Khor Abu Habil River. Crops are long staple cotton and durra. Seed for the Gezira comes from the Gash Delta.

Private pump schemes have also added to the irrigated acreage—more than a million acres in the past half century. The first class of pump projects, 2,000 schemes with 640,000 acres, draws water during the season when there is no surplus water in the Nile. The other class of pumps supplies about 440,000 acres and can draw water only during surplus periods. Private development programs will double this latter area. In the north, grains and pulses are the main crops, but fruits—dates, citrus, and mangos—are increasing. South of Khartoum, the first class of pump schemes produces long staple cotton.

Projects in Rain-Fed Areas.—In 1945, large-scale experiments in mechanized farming were begun in the Gedarlf District of Kassala Province, for the production of grain. Experiments with farm machinery are also being carried on in the heavier rainfall areas to the south. In the fertile area of the Nuba Mountains, about 300,000 acres have been developed, with governmental assistance, for the production of short staple cotton, millet, sesame, and peanuts.

Current Development Programs

Recent economic development in the Sudan has been financed from central budget surpluses, beginning with the substantial surplus accumulated during World War II. From 1946 up to June 30, 1956, a total of \$175 million had been

allocated for development through special budgets established under a series of Five-Year Plans.

The first Five-Year Plan was scheduled for 1946-50, and some of the irrigation projects described in the preceding section were completed under this Plan, including an extension of the Gezira Scheme and raising the height of the Sennar Dam. This plan was closed out June 30, 1957. Of the 193 schemes included in the program, 192 were completed and one transferred to the 1951-55 program.

The second Five-Year Plan, commenced in 1951-52, was to run through 1955-56. It was extended in 1956, and a special budget was established for another expansion of the Gezira, called the Managil Extension. This plan is expected to be closed out in 1958. Of the 312 schemes, 229 have been completed, 45 are expected to be completed in a year, and 35 have been transferred to the 1957-58 budget. The Guneid Pump Scheme was an important project under this plan.

In June 1957 a third Five-Year Plan was submitted to the Ministerial Committee for Development. Nearly \$345 million was planned to be spent under this Plan. However, in view of the large amount of capital required and in the absence of any clear indication of the form and extent of loans which might be obtained from the International Bank for Reconstruction and Development and other sources, the government did not consider it prudent to accept a 5-year commitment at this stage. Thus, only the most essential projects were included in a 1-year development budget.

The current budget calls for an expenditure of about \$55 million, of which \$28 million is allocated for the Managil Extension (which includes \$9.8 million of last year's unspent balance). The remaining \$27 million is for new schemes for the fiscal year and includes projects considered essential for development which should not be delayed. This is the largest development budget for a single year in the Sudan's history. Funds still unspent from the 1951-55 development budget would bring up the total development expenditures to over \$64 million.

This year's development budget is financed from the following sources:

Unallocated budget surpluses for—	<i>Million dollars</i>
1954-55.....	4.5
1955-56.....	17.2
1956-57.....	17.2
1957-58.....	12.2
Unspent balance of Managil account.....	9.8
Unspent balance of 1951-55 account.....	9.4
Total.....	70.3

This leaves a very small margin (\$6 million) for unforeseen commitments and uses nearly all available funds from past and anticipated budget surpluses. With the difficulties the Sudan has had in selling its cotton this season, funds allocated from the anticipated 1957-58 budget surplus probably will not be available, and development plans may have to be curtailed. When the Sudan's long staple cotton prices were lowered to a level at which the cotton would sell and the export tax was cut, cotton exports boomed for a period. Sales did not continue, however, and the Sudan still has about 38,000 tons of last year's crop on hand. This

situation, combined with a very poor crop this year and further reductions in prices and the export tax, will place the Sudan in a difficult financial position.

About 40 percent of the revenue of the government comes directly from cotton. In the 1957-58 budget it was estimated that revenue from cotton would amount to the following:

	<i>1,000 dollars</i>
Export tax on long staple cotton.....	21, 530
Government's share of Gezira profits.....	25, 260
White Nile Pump Scheme.....	1, 230
Tokar, Gash, and Nuba Mountain Schemes.....	2, 120
Export tax on cottonseed, cottonseed cake, and short staple cotton.....	1, 260
Total.....	51, 400

Expansion of Irrigation.—The Managil Extension is the most important development project in the present Plan, and the government is determined to proceed on schedule despite budget difficulties. This project will add about 830,000 acres to the irrigated area of the Gezira. It is to be accomplished in four stages, with about 215,000 acres due to be ready for cultivation in 1958-59 and the remainder planned within 4 years. Total cost is estimated at \$85-\$100 million.

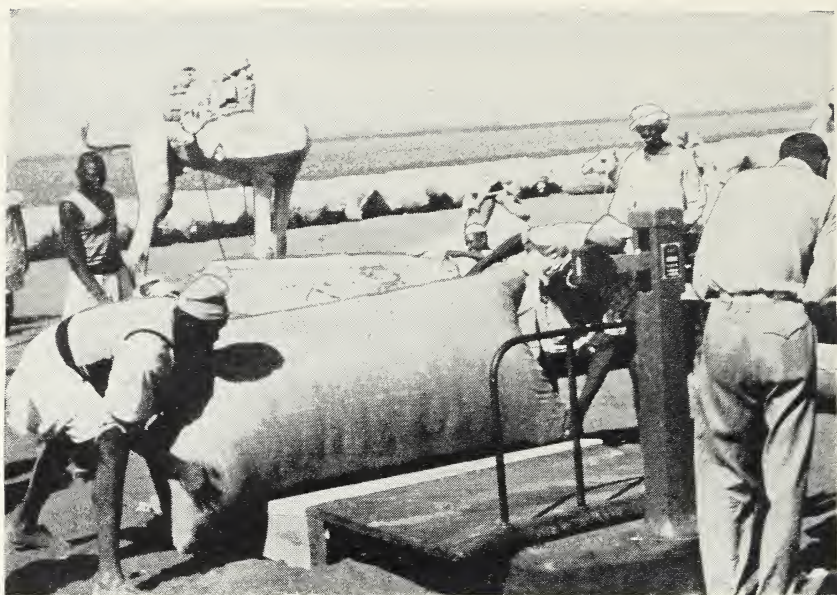
Water for the first 215,000 acres will come from the present main canal, from which is being dug a branch canal. For the remaining 615,000 acres, a main canal will be dug parallel to the first one, and new head regulations will be provided at the Sennar Dam. The new main canal is to be completed in 1959.

The Sudan Gezira Board will manage the Managil Extension. Units will be 30 feddans (31 acres), with a rotation of 10 feddans in cotton, 10 in food crops and forage, and 10 fallow. Two cultivators will be assigned to each unit. (It has been observed that at least one-third of the units on the Gezira are now split between father and son.) This arrangement will reduce some problems with hired labor and it is believed that, with higher yields, 5 feddans of cotton will be sufficient for most farmers.

The Sennar Dam does not have the capacity to provide the same supply of water to the Managil Extension that the Gezira now receives; therefore, it is tentatively planned that irrigation will stop January 31 on the Managil and March 31 on the Gezira.

A full supply of water will depend upon the building of the Roseires Dam. Plans have been completed for this dam, which will provide storage for three times the volume of water now stored in the Sennar Dam. These plans may be revised to raise the height of the dam and increase its capacity. This dam would not only provide additional water for the present area under cultivation in the Gezira and for the Managil Extension, but it would also supply water for the development of 1.25 million acres in the new Kenana Extension in the southern part of the Gezira Plain. Water would be available, too, for an additional 1.55 million acres of land to be irrigated by pump schemes.

It was hoped that construction of the Roseires Dam could have been started in 1958. However, two important problems must first be solved: Source of funds to finance the project, and agreement with Egypt and other countries on the division of the water of the Nile presently unallocated.



Weighing in cotton as it comes from the field in the Sudan's Gezira Delta (above). Moving bales of cotton from railroad to ship at Port Sudan (below). Almost all of the Sudan's cotton is long staple, and it earns 60-80 percent of the country's foreign exchange. The development program of this new country emphasizes expansion of this important crop, though thought is being given diversification.



The average annual flow of the Nile at Aswan (in Egypt) is approximately 84 milliards.¹² According to the Nile Waters Agreement of 1929 between Egypt and the United Kingdom, Egypt's share is 48 milliards and Sudan's, 4 milliards. This leaves 32 subject to further agreement. Numerous proposals have been made, one of which would divide the Nile water by the ratio of the populations of the two countries. This would give Sudan approximately one-third of the water. Another, supported by Sudan, would make the division on the basis of the acreage suitable for cultivation, and would give the Sudan even more water. It will be difficult to obtain agreement from Egypt on these proposals. The Sudan, being upstream on the Nile, is determined to move ahead with its development plans on the assumption that some agreement must eventually be reached. However, it is doubtful that the World Bank will consider granting loans until agreement is reached. Financing the Roseires Dam and part of the Managil Extension will be almost impossible without loans. Conferences were held in Cairo in January 1958 on the Nile water division but no decision was reached.

Two other important irrigation projects are under investigation by the Sudanese Government—the Atbara Diversion Scheme and the Jonglei canal. The Atbara Scheme would irrigate 520,000 acres of land with a dam on the Atbara River at Khashm el Girba. If the High Aswan Dam is built in Egypt, the Wadi Halfa area in the Sudan would be flooded and most of its 50,000 inhabitants would be relocated on the Atbara Scheme at the expense of the Egyptian Government. The Jonglei canal would be built in southern Sudan. Here, much of the water of the White Nile is lost in the great marshes of the Sudd region. It is proposed to bypass this area by constructing the canal. It is estimated that 520,000 acres of land could be irrigated along the canal.

The Sudanese believe the construction of the High Aswan Dam will result in the loss of much water by evaporation—10 milliard cubic meters annually. They insist that development of the entire Nile Valley be dealt with in one general plan and propose the construction of a series of smaller dams, for water storage and hydro-electric power, along the upper main Nile and along the Blue and White Niles, where rate of evaporation would be much less.

Other Agricultural Development Projects.—In addition to the irrigation schemes, other projects of interest to agriculture are included in the current development budget. These include developing underground water, pilot projects for mechanized crop production, organizing an agricultural bank, improving Port Sudan ginnery, reorganizing the Nuba Mountains cotton industry, expanding rice and coffee in the south, building a date processing plant, improving research and education institutions, and investigating alternative cash crops.

Foreign Aid.—After many years of foreign domination, the Sudan has been cautious about accepting foreign aid. However, missions from agencies of the United Nations have been received in the past few years. Recently, the Sudan requested the visit of a United States International Cooperation Administration survey team to study the possibilities of technical aid. This team recommended such aid, and technicians are now in the Sudan to set up an aid program.

¹² A milliard is one billion cubic meters, or approximately 810,700 acre feet.

Effect of Development on Competitive Products

The projected development of irrigation in the Sudan which might reasonably be expected to be achieved in the next 10-15 years should increase the amount of land under irrigation approximately to the following levels (including some expansion of private schemes):

	<i>Mil. acres</i>
1957.....	2.5
1960.....	2.7
1965.....	3.3
1970.....	5.5

Even though the government is investigating alternative cash crops and realizes the tenuous position a one-crop economy has, development plans have called for long staple cotton as the principal cash crop on the new irrigation schemes.

This would probably increase long staple cotton production 10-15 percent by 1960, 40-50 percent by 1965, and as much as 150 percent by 1970 if the Roseires Dam is built. Since the Sudan exports almost all its cotton and very little development of the textile industry is planned in the next few years, exports would be expected to increase at about the same rate as production.

The greater part of the increase will be of extra long staple Sakel, of 1 $\frac{3}{16}$ " to 1 $\frac{1}{2}$ " in length. The Domains Sakel compares with the Karnak of Egypt and the American-Egyptian Pima S-1 of the United States. The Lambert Sakel is more like the Giza 3 of Egypt and the longer staple uplands of the United States.

Although development plans include some expansion of cultivated acreage in the rain-fed areas, a significant increase in the production of short staple cotton has not been anticipated. However, if difficulties persist in the production and marketing of long staple cotton, some areas may shift to short staple varieties.

Sudanese cotton will be sold in Western Europe and the Far East. Increases in exportable supplies will mean more competition for United States cotton there.

There will be substantial increases in food crop production but, with the exception of peanuts, sesame, and of course cottonseed, exports of these products will not be of any importance.

The recent difficulty through which the Sudan has passed in marketing its record cotton crop may cause the government to review its agricultural development plans and diversify commercial production for export. There has been a strong demand in the world market for long staple cotton. However, the high prices of Egyptian and Sudanese cotton in the past 2 years have not had a healthy effect on this market. Even though a large proportion of Egypt's cotton exports has been shifted from Western markets to the Soviet area, increased volumes of Sudanese cotton must still be reasonably priced to move in the world market.

The Sudan has vast areas of land which can be developed for agricultural production. There are relatively few trained agricultural technicians, and a large part of the rural population is living in a primitive situation. However, existing social structures are not so rigid as to prohibit change, as experience over the past 25 years has demonstrated. Also, the government and the people have the will to improve their economic position. In the next few decades, the Sudan could emerge as one of the most important agricultural nations in the Middle East.